

AMERICAN EXPLORATIONS

ICE ZONES





THE LIBRARY
OF
THE UNIVERSITY
OF CALIFORNIA

PRESENTED BY
PROF. CHARLES A. KOFOID AND
MRS. PRUDENCE W. KOFOID



3.00

11 91

50¢

n

Henkil



Digitized by the Internet Archive
in 2008 with funding from
Microsoft Corporation



IN THE PACK.

AMERICAN EXPLORATIONS

IN

THE ICE ZONES.

THE EXPEDITIONS OF DeHAVEN, KANE, RODGERS, HAYES, HALL, SCHWATKA, AND DeLONG;
THE RELIEF VOYAGES FOR THE JEANNETTE BY THE U. S. STEAMERS CORWIN, RODGERS,
AND ALLIANCE; THE CRUISES OF CAPTAINS LONG AND RAYNOR OF THE
MERCHANT SERVICE; THE GREELY EXPEDITION AND RESCUE OF THE
SURVIVORS; THE DISCOVERIES OF LIEUTENANT LOCKWOOD,
AND THE NAVAL EXPLORATIONS IN ALASKA UNDER
LIEUTENANTS RAY AND STONEY.

WITH A BRIEF NOTICE OF

THE ANTARCTIC CRUISE UNDER LIEUTENANT WILKES, 1840,
AND OF THE LOCATIONS AND OBJECTS OF THE U. S.
SIGNAL SERVICE ARCTIC OBSERVERS.

Prepared Chiefly from Official Sources

BY PROF. J. E. NOURSE, U.S.N.,
EDITOR OF "HALL'S SECOND EXPEDITION."

THIRD EDITION.

BOSTON:
D. LOTHROP AND COMPANY,
32 FRANKLIN STREET.
LONDON: TRÜBNER & CO., LUDGATE HILL.

Copyright,
By D. LOTHROP AND COMPANY.
1884.

C. J. PETERS AND SON,
ELECTROTYPERS AND STEREOTYPERS,
145 HIGH STREET.

G630
A5N9
1899

TO
THE AMERICAN EXPLORERS,
NAVAL, MILITARY, AND CIVIL,
AND
TO THE MEMORY OF THE GALLANT SPIRITS
WHO OPENED UP THEIR
PATHWAY.

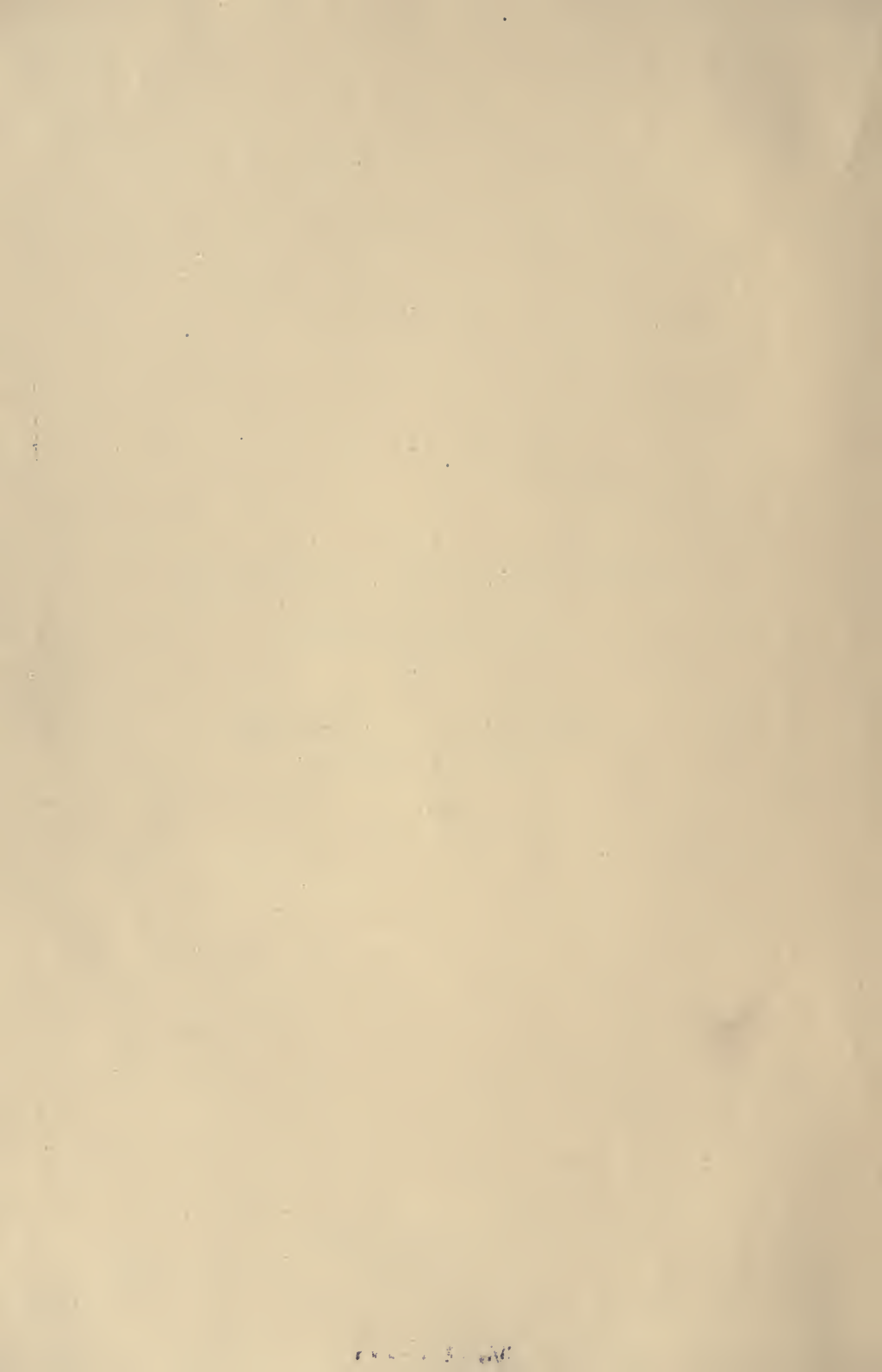


TABLE OF CONTENTS.

CHAPTER I.

The Arctic regions, sea and land — Comparison of the ice zones of the North and the South—The problem of the Pole and the Northwest Passage—Chief attempts for its solution — Participation in these attempts by the American Colonies—American voyages resulting from the Franklin Expedition, and their renewal in 1850 . . .	PAGE 17
---	------------

CHAPTER II.

The Grinnell Expeditions — Reviving Arctic exploration.— President Taylor's message to Congress transmitting correspondence with Lady Franklin — Resolution authorizing the expedition approved, May 5, 1850—Mr. Grinnell's memorial supported by Clay, Seward, and Pearce, in the Senate — Officers of the First Expedition — Instructions of Secretary Preston to DeHaven, who sails from New York, May 22, 1850 — Dispatches from St. Johns and the Whale-Ship Islands — DeHaven's report of the graves found at Beechey Island — He arrives at Griffith Island — Drifts northward — Geographical discoveries — Eastward into Baffin's Bay — Freed from the ice, June 10, 1851 — Again released, Aug. 18 — Sails from Holsteinborg, Sept. 6 — Arrives at New York, Sept. 30	41
--	----

CHAPTER III.

THE SECOND GRINNELL EXPEDITION, 1853-55.

The expedition designed by Kane — Contributors — Paper read before the Geographical Society of New York—Assistance by the Secretary of the Navy—Officers of the "Advance"—Fiskernaes — Crossing Melville Bay—The "Advance" moored to an iceberg — Rensselaer Harbor — Provision depots for spring explorations — The observatory — Daily ship life — Morton's reported Polar Sea — The brig fixed in the ice — Attempt to reach Beechey Island — Nine of the company leave for the South; their return — Scurvy — The brig abandoned — Boat and sledge journey southward — Rescue of Kane by Captain Hartstene at Disco — Arrival at New York — Reports to the Department — Summary of results.— Appreciation by the British Government — Publications of the narrative — Kane's failing health — Request of Lady Franklin to him to undertake a new expedition — He sails for England — Return voyage — Death — Funeral honors at Havana, New Orleans, Cincinnati, Columbus, Baltimore, and Philadelphia — Kane's religious confidence	65
---	----

CHAPTER IV.

EXPLORATIONS OF LIEUTENANT JOHN RODGERS, U. S. N.

The Exploration of the "Vincennes" a part of the United States Expedition under Commander Ringgold—Appropriation by Congress—Objects—Secretary Kennedy's instructions—Sickness of Commander Ringgold—Lieutenant Rodgers succeeds to the command—Loss of the "Porpoise"—The "Vincennes" leaves Hong Kong for her Arctic cruise—Arrives at Petropaulovski—Condition of the town—Enters Bering Straits—Leaves a party under Lieutenant Brooke at Glassenapp—Habits and customs of the natives—The "Vincennes" in the Arctic Sea—Anchors in latitude 72° 5' North—Sails over the tail of Herald Shoal and locates Herald Island—Can see no trace of Plover Island—Approaches Wrangell Land—Returns to St. Lawrence Bay and Glassenapp for Lieutenant Brooke's party—Arrives at San Francisco, Oct. 13, 1855—Suggestions for the publication of the full narrative 108

CHAPTER V.

EXPLORATIONS OF DR. ISAAC I. HAYES, 1860-61.

Design of Dr. Hayes for a new exploration suggested while on his first voyage with Kane—His plans supported by the Smithsonian and other institutions—Sails from Boston with Sonntag, July 7, 1860—Arrives off Pröven on the twenty-fourth day out—Adds to his ship's company and supplies at Upernavik—Crosses Melville Bay in fifty-five hours to Cape York—Winters at Port Foulke—Observatory set up—Observations made—Experiences of the season—Death of Sonntag, Hans' account of it—The Arctic night described—Attempts to launch the boat on the Polar Sea—Highest point reached—Belief in the existence of the open sea confirmed—Experiences of recent navigators compared with this—Explorations and surveys made on the return voyage to the United States—Purpose of a new expedition—Reception of the gold medals from abroad—Volumes published 132

CHAPTER VI.

THE GRINNELL AND HAVEN EXPEDITION OF C. F. HALL—THE FIRST OF HIS THREE VOYAGES, 1860-62.

Hall's motives for his first voyage—Arctic study—Limited resources—Reasons for believing that some of Franklin's men still lived—Circular endorsed by leading men of Ohio—Generous aid by Mr. Grinnell and by Williams and Haven—Sails from New London—Buries his native companion, Kud-la-go—Visits Holsteinborg—The kayaks—The belted and the gothic icebergs—Arrives at Cornelius Grinnell Bay—First impressions of the natives—Destruction of the "Rescue" and the expedition boat—First acquaintance with Ebierbing and Too-koo-li-too—Inland excursion—Explorations in the spring following—Discovery that Frobisher "Strait" is a bay—Finding of the Frobisher relics confirmed by Barrow's history—Explorations in the spring and summer of 1862—Notes of Eskimo dress, habits, and superstitions—Return to the United States with the two natives and their child 161

CHAPTER VII.

HALL'S SECOND ARCTIC EXPEDITION—RESIDENCE AMONG THE
ESKIMOS, 1864-69.

Preparatory labors—Paper before the American Geographical Society—Fro-
bisher relics sent to London and to the Smithsonian—Lectures—Plans for the new
voyage—Sailing of the "Monticello"—Landing at Whale Point—First inter-
course with the natives—Feasting—Ankooting—The Key-low-tik—Walrus hunt
—New Year's Day—Sealing—Hall's first prize—Capture of a whale—Winter quar-
ters at Fort Hope—Hall's daily life—Auroras—Refraction and parhelia—Native
mapping—Unsuccessful advance westward—Franklin relics—Journey to Cape
Weynton—Journey to Fury and Hecla Straits—A mutineer—Journey to Igloodik
—Visit to King William Land—Franklin relics—Capture of the third whale—
Return to the United States 199

CHAPTER VIII.

HALL'S VOYAGE IN THE "POLARIS."

Early design to reach the pole—Lectures in Washington—Appropriation by
Congress—The "Polaris" sails from New York—Arrives at Fiskernaes—U. S. S.
"Congress" at Godhavn—Hans Hendrick—Tessuissak—North water reached
—The "Polaris" beset at 82° 16'—Consultation—Drift to the South—Anchored
to Providence Berg—Winter quarters—Sledge journey—Deposit in the cairn—
Hall's death and burial—Winter of 1871-72—Auroras—Return of the sun—The
"Polaris" leaves the harbor—Drifts South—The separation—The ship leaking
—House on the floe—Drift of the floe party and rescue—Relief ships sent for the
"Polaris"—DeLong's cruise—Rescue of the Polaris party by the "Ravenscraig"
—Hall's memorials—Medal awarded—Tablet put up by the English Expedition
—The Eskimos Kud-la-go, Joe, Hannah, Ou-se-gong, and Abbot—Graves at
Groton, Conn. 269

CHAPTER IX.

SLEDGE JOURNEY OF LIEUTENANT SCHWATKA, U. S. A.

Reports from Hudson's Bay which occasioned the journey—Sailing of the
"Eothen"—Arrival at Depot Island—The true story of "The Spoon"—Decision
to cross to King William Land—Meeting with the Innuits; their stories—Visit to
the cairn—Remains of Lieutenant Irving, R. N., identified—Journey to Cape
Felix—No records found—Relics of Franklin's Expedition—Camping out and
sledge journey, October, 1879, to March 4, 1880—Return to the United States—
Award of a medal by the Geographical Society of Paris—Recognition of the work
by Congress—Renewed search for the records and journals of the Franklin Ex-
pedition 345

CHAPTER X.

LIEUTENANT DeLONG'S EXPEDITION TOWARD THE POLE, 1879-81.

The expedition DeLong's own prompting — Mr. Bennett undertakes it — Selection of the route — Theories — DeLong's plan — The "Jeannette" commissioned — Report of the Board of Inspection at Mare Island — Officers and Crew — Sailing from San Francisco — Arrival at St. Michael's — Reports of Nordenskiöld — Passing the Straits — Attempts to reach Wrangell and Herald Islands — Frozen in the Pack, September 6 — Chipp attempts the crossing to Herald Island — The "Jeannette" drifts northwest past Wrangell Land — Pumping begun — Lieutenant Danenhower disabled — The return of the sun — Experiment of the windmill pump — DeLong abandons the theory of the currents — Scientific observations kept up — The frozen summer — Auroral phenomena — Continued drift northwest — Discovery of Jeannette and Henrietta Islands — The "Jeannette" crushed — Landing on the floe — Discovery of Bennett Island; description of it by Dr. Ambler — The three boats — Their separation — The whaleboat party land on the Lena Delta — The first cutter under DeLong — Sufferings — DeLong's last entries — Danenhower's search — Melville's search — The dead ten found — Their burial — Return of Lieutenant Danenhower — Search begun by Lieutenant Harber — Engineer Melville's return — Appropriation to bring the bodies home — Their expected arrival 363

CHAPTER XI.

RELIEF EXPEDITIONS FOR THE "JEANNETTE"—THE TWO FIRST
CRUISES OF THE "CORWIN"—THE CRUISES OF THE
"RODGERS" AND "ALLIANCE."

THE "CORWIN'S" FIRST CRUISE, 1880.

The missing whalers — Instructions of Secretary Sherman for their search and for the "Jeannette" — The ship refitted at San Francisco — Arrives at Ounalaska, June 7th — Nipped in the pack off Cape Romanzoff, June 16th — Enters the Arctic Sea, 28th — Last sight of the "Mount Wollaston" and "Vigilant" reported by Captain Bauldry — Visit to the cave dwellers on King's Island — The coal vein East of Cape Lisburne — Within seven miles of Herald Island — Wrangell Land in sight — Land seen to the North — Return of the "Corwin" — Captain Hooper's notes of the ice — Of the habits and customs of the natives on the shores of the Arctic and Bering Sea 428

SECOND CRUISE OF THE "CORWIN."

Instructions of Secretary Sherman — Officers — Sailing from San Francisco — Onalga Pass — Ounalaska — St. Lawrence Island — Reports of the missing ships at Cape Serdze-Kamen — Arrival of the "Corwin" — Sledge party to search the shore — Plover Bay — Return to Cape Serdze — Landing on Herald Island — Character of the Island — Landing on Wrangell Land — Discovery of this land by Captains Long and Raynor, 1867 — Visit to Point Barrow — Return to San Francisco — Tribute to DeLong 447

THE CRUISE OF THE "RODGERS."

Petitions to Congress for relief of the "Jeannette"—Appropriation granted—Selection of vessel—The "Mary and Helen" purchased—A Naval Board convened for advice in regard to the search—Its officers—Suggestions—Testimony of ship-captains and experts—Instructions to Lieutenant R. M. Berry—The "Rodgers" equipped and commissioned—Her officers—Arrives at St. Lawrence Bay, at Petropaulovski, Wrangell Land—Finds a harbor and explores the island—Reaches lat. $73^{\circ} 44'$ —Arrives at Cape Serdze and lands a party to search for the missing crews—The "Rodgers" burned—Master Putnam lost on the ice—Lieutenant Berry searches the coast—Joins Engineer Melville at Yakutsk—Learns the orders to Lieutenant Harber and returns home 473

THE CRUISE OF THE U. S. STEAMER "ALLIANCE," JUNE 16 TO OCT. 11, 1881.

Fitting out of the "Alliance"—Instructions to Commander Cooper and to Commander Wadleigh—Arrival at Reykjavik—Description of the "Jeannette" circulated—The harbor of Hammerfest, Norway—Green Bay, Spitzbergen—Tidal marks established—Cruise in lat. 79° —The ice barrier—Return to the United States under orders 485

CHAPTER XII.

THE ANTARCTIC CRUISE OF LIEUTENANT (LATE ADMIRAL)
CHARLES WILKES, U. S. N., 1839-40.

The Antarctic region a *terra incognita*—Object of its explorations compared with explorations in the Arctic—National aid required—Earliest American discovery—Foreign explorations, private and national—Wilkes' cruise a part of the plans of the exploring expedition of 1838-42—Organization of the squadron and its route—First cruise towards Cook's *Ne-plus-ultra*—Cruise along the icy barrier—Reported discovery of the continent—Award of the gold medal by Royal Geographical Society, London—Discoveries of Ross—Scientific results—Collections in the National Museum, Washington 489

CHAPTER XIII.

SUMMARY OF THE EXPEDITION, BENEFICIAL RESULTS.

The American Arctic Expeditions—Highest points reached—Value of Arctic explorations endorsed by Weyprecht, Maury, Henry, Bache, Barrow, and Osborn—Meteorological stations in the ice zones—Their purpose distinct from the Polar problem—Lieutenant Weyprecht's proposition—Stations under the International Commission recommended by Professor Henry—Preliminary voyage of the "Florence"—Sherman's and Kümlien's reports—Signal Service Station at Lady Franklin Bay—Unsuccessful attempts for relief—Signal Service Station near Point Barrow—Preliminary reports—Geographical discovery—Benefits to the whale fisheries—Small number of lives lost in the expeditions—Further explorations . . 525

CHAPTER XIV.

THE RELIEF OF THE GREELY EXPEDITION.

The Signal Service Observers at Lady Franklin Bay—The Relief Provided— The Officers in Command—News of the Rescue—The Cruises of the three Relief Ships—The Greely Records found on the Island—The Return of the Relief Ships to the United States—The Outlay	567
--	-----

CHAPTER XV.

ALASKAN EXPLORATIONS.

Exploration under the Western Union Telegraph Company—Work of the United States Coast Survey in Alaska—Lieutenant Ray's Observations and Explorations— Decrease of Magnetic Force—No Polar Sea believed to Exist—Recent Explorations by Lieutenant G. P. Stoney	595
--	-----

LIST OF ILLUSTRATIONS.

CIRCUMPOLAR MAP	<i>Pocket.</i>
MAP OF SMITH SOUND	<i>Page</i> 159
MAP OF THE DELTA*	409
MAP OF ALASKA AND THE STRAIT	470, 471
MAP OF WRANGELL ISLAND	479
MAP OF NORTH GREENLAND	588
MAP OF NORTH WEST ALASKA	601

Wood Engravings.

	PAGE		PAGE
In the Pack	<i>Frontispiece.</i>	Eskimo and Seal Dog	192
Sealing an Iceberg	19	Seal Hole and Igloo	194, 195
Portrait of John Franklin (<i>to face</i>)	32	Too-koo-litoo, Hall, and Ebierbing	197
Barometer of Franklin's Expedition	38	Eskimo Lamp	198
The Crow's Nest	55	Sir Martin Frobisher	201
The Three Graves	58	Frobisher Bay and Grinnell Glacier	207
Portrait of Kane* (<i>to face</i>)	65	Polar Bear of Hudson Strait	208
Harbor of St. Johns	69	Snow Partridges	212
An Arctic Moonlight Scene (<i>to face</i>)	87	Hall's First Igloo, Ground Plan	213, 214
Godhavn	90	Game of Cup and Ball	216
The Kane Medal	105	Key-low-tik and Ken-toon	217
Portrait of Admiral Rodgers (<i>to face</i>)	108	Playing the Key-low-tik	219
Portrait of Dr. Hayes* (<i>to face</i>)	132	Sek-koons	220
Belted Iceberg	134	A Walrus Hunt	223
Upernavik	135	A Walrus Head	224
Foulke Fiord	143	Ground Plan of New Year's Day Igloo	226
The Best Part of a Sledge Journey	146	Ground Plan of Igloo built on a Journey	227
Unfurling the Flags ("The Open Polar Sea," J. R. Osgood & Co.)	148	Arrowtar	228
A Snow Village	156	Ebierbing going out Sealing	230
Portrait of C. F. Hall (<i>to face</i>)	161	Capturing a Whale	233
Vignette of Sir John Franklin	164	Too-koo-litoo (Hannah)	236
Governor Elborg in his Oomiak	169	Ar-too-a drowned in his Kia.	237
Eskimo Woman and Child	170	Innuik Head-Ornament	238
Kyak Somerset	171	Now-Yarn Harbor	239
Gothic Iceberg	172	Aurora sketched by Hall	241
Loss of the "Rescue"	175	Papa's Sketch of Pond Bay	242
Nik-n-jar, the Boat Steerer	176	Franklin Relics	247, 248
Eskimo Dog	177	Bone Charms and Knife	251
Eskimo Lamp	178	The Tenting-Place	254
Storm Bound	179	Monument and Coast-Line	255
Passing through Lupton Channel	183	Hall's Boat-Log	257
Indian Summer Village	184	Snow Village	258
One of Frobisher's "Gold Mines"	185	Setting Out for King William Land	260
		Hall's Tablet-Covers	261

* From "The Jeannette," by Captain Perry. Newman & Coburn Publishing Company.

	PAGE		PAGE
Ivory Knives	262	Lieutenant Schwatka ("Schwatka's Search,"	
Page of Hall's Note-Book	263	Scribner's Sons) (<i>to face</i>)	345
Sir John Franklin's Desk	266	Franklin's Spoon	350
Hannah's Musk-Ox and Deer Horns	268	The March Southward ("Schwatka's Search,"	
Fiskernaes	272	Scribner's Sons)	355
Lichtenfels	274	Cold Weather	357
Tessuissak, or Tessiussak	277	The Schwatka Medal	362
Shooting Walrus	279	Lieutenant-Commander DeLong* (<i>to face</i>)	363
"Polaris" passing Fitz-Clarence Rock	281	Lieutenant Chipp*	374
Working through the Ice	283	Lieutenant Danenhower*	376
"Polaris" in Thank-God Harbor	285	Engineer Melville*	379
Landing Stores on the Ice	287	Surgeon Ambler*	382
Shooting a Musk-Ox	290	An Arctic Boat Journey	404
The Cairn	294	The Cross*	415
Funeral of Captain Hall	299	The Tomb*	417
The "Polaris" Adrift	301	The "Corwin" in a Nip	431
Fastening to the Berg	303	Herald Island	435
Mock Moons	309	Oomiak	445
"Polaris" rounding the Berg	311	Arctic Ravine	454
Boat Camp	313	Wrangell Island	465
House on the Floe	314	The Penguins ("Wood's Natural History,"	
Before Separation	315	Porter & Coates)	504
The Separation	317	The Albatross ("Wood's Natural History,"	
Polaris House, Life-Boat Cave	319	Porter & Coates)	507
Landing on Northumberland Island	328	Commander Schley	571
Sighting the "Ravensraig"	330	Rescue of Greely Survivors	573
Hall's Medal from Paris	333	Portrait of Lieutenant Greely	576
Hall's Grave	338	Portrait of Lieutenant Lockwood	579
On-se-gong and Kud-lup-pa-mune	342	Lieutenant W. H. Emory	583
		Portrait of Lieutenant Ray	605

* From "The Jeannette," by Captain Perry. Newburn & Coburn Publishing Company.

THIS volume purposes to accredit the work of American explorers in a region toward which the world still looks with interest and unsatisfied inquiry. Arctic exploration will not soon be abandoned. However much, in this age of unprecedented advance in the more directly practical, it may seem to some to deserve place with the visionary only, it confessedly embraces problems of high value. The geographer would gladly exchange his dotted and broken lines for definite boundaries; the ethnologist and the Christian have questions to ask of this region bearing on the unity and the development of the race; and the scientist awaits from the sea of the far-off North, revelations the key to which Nature has as yet hidden from him.

A third of a century has passed since history cordially admitted to her domain the records of De Haven and Kane; Hayes and Hall gave to her their work of the succeeding decade; our younger officers—De Long, Chipp, and their associates—have closed with their lives the latest Arctic records.

The volumes from Kane's pen cannot be found on the shelves of a large number of our increasing libraries, while the publications of the United States Government, in official form, are too bulky for the convenience of the general reader. It is the design of the publishers of the volume now offered, to bring together within the reach, especially of the young, the labors of each American explorer, and to this desire the most cordial response is made from a re-study of these labors, each of which reflects honor upon our country. The chapters which follow embrace brief notices of the expedition for the Northwest passage under Sir John Franklin, the voyages of Lieutenant De Haven, and of Dr. Kane, of the late Admiral Rodgers, Dr. Hayes, the three expeditions of C. F. Hall, the remarkable sledge journey of three thousand miles by Lieutenant Schwatka, U.S.A., the cruise and loss of the "*Jeannette*," and the relief expeditions sent out for De Long by the Treasury Department under Captain Hooper, and by the Navy Department under Lieutenant Berry. To these is added a notice of the first expedition sent out by the United States for scientific purposes, that of 1838-42 under Lieutenant (late Admiral) Wilkes; the volume closes with a statement of the positions and objects of the Arctic Observers under the U.S. Signal Service, the burial of the dead from the *Lena*, the Relief Expedition for Greely, Lockwood's and Greely's discoveries, and U. S. Coast Survey and Naval Explorations in Alaska.

J. E. N.

AMERICAN EXPLORATIONS

IN

THE ICE ZONES.

CHAPTER I.

THE ARCTIC REGIONS, SEA AND LAND.—COMPARISON OF THE ICE ZONES OF THE NORTH AND THE SOUTH.—THE PROBLEM OF THE POLE AND THE NORTHWEST PASSAGE.—CHIEF ATTEMPTS FOR ITS SOLUTION.—PARTICIPATION IN THESE ATTEMPTS BY THE AMERICAN COLONIES.—AMERICAN VOYAGES RESULTING FROM THE FRANKLIN EXPEDITION, AND THEIR RENEWAL IN 1850.

THE field of Arctic exploration includes a section of the earth's surface not strictly coincident with the Arctic circle of the geographers. Countries such as South Greenland, Labrador, or Alaska, in the western hemisphere, or the region around Lake Baikal in the eastern, though situated as low as the sixtieth, or even the fiftieth parallel of north latitude, have a decidedly Arctic climate, with its products; while others, as the coast of Norway, lying far nearer the Pole, but under specially favorable influences, enjoy in midwinter a remarkably mild temperature.

Arctic exploration has of necessity employed itself both upon the stormy sea and upon the snow and ice-bound land. The great ocean surrounding the Pole drains the northern slopes of three continents, receiving the waters of an estimated area of more than four and a quarter millions of square miles, and its river systems exceed those of the West Atlantic coast. Within this great basin the Pole itself is, as yet, shut out from access by an investing zone of probably permanent ice; beyond this zone, theory still places an open sea.

The undiscovered polar region is limited, at most points on the American and European sides, by about the eighty-second parallel; on the north of Asia the limit is as low as the seventy-fourth degree. To the inner basin there are but three possible ways of entrance: the estuaries of Hudson's and Baffin Bays, north of America; the space between Greenland and Norway, north of Europe; and Behring's Straits, between America and Eastern Russia.

The lands of the Arctic region are naturally divided into two well-marked zones,—the forests and the treeless wastes. In America the latter are the well-known "barrens," or "barren grounds," which yield a scanty subsistence to the suffering natives, and were traversed with so much hardship by Franklin and by those who sought for him by land in the explorations hereafter to be noted. In the eastern continent they bear the name of the "tundra," often showing nothing more than boundless morasses or arid wastes, tracked by the feet of Siberian exiles and arctic explorers, including the perishing ones from the "Jeannette" and its survivors in their search for the lost. Over such scenes many weary sledge-journeys have been made, to the extent of more than a thousand miles each. A narrative of Arctic exploration leads, therefore, not only to the well-furnished ship, or even to her deck when housed for the winter storms, but to perilous journeys over tracks at times scarcely distinguishable by the most experienced; over ice-floes and fissures, requiring the scaling of the rough and dizzy crests of the bergs. The chief scene of Arctic exploration, however, is upon the tempestuous sea, with its closing nips, and, at times, equally dangerous and sudden openings on the seaman. The mysterious waters hold a fascination possessed by no other region, creating and keeping up an indescribable longing for adventure, in which daring spirits have found all that makes travel exciting.

The ice zones of the south present no such allurements. No continents there approach the ocean's shore, while a glance at the world's map shows, in the north, a preponderance of land, spreading out in such almost unbroken continuity as to tempt some to the theory that nearer the Pole the land masses are separated by

a chain of islands only. This essential difference in the land surfaces accounts in part for the extreme difference in the summer temperatures of the two zones. The ice barrier of the south has been but once penetrated beyond the seventy-eighth degree. And while, even in Spitzbergen, vegetation ascends the mountain slopes to a height of



SCALING AN ICEBERG.

From Captain Hall's "Arctic Researches," published by Harper & Bros.

three thousand feet, in every land within or near the Antarctic circle the snow line descends to the water's edge. Not even a moss or a lichen has been observed beyond south latitude $64^{\circ} 12'$. In Spitzbergen the thermometer has risen to $58\frac{1}{2}^{\circ}$, but during the summer months spent by Sir James Ross in the Antarctic, the temperature of the air never once exceeded $41^{\circ} 5'$. No hunters there, like the Eskimos, chase the seal or the walrus; no herdsmen, like the Lapps, follow the reindeer to the ocean's edge; not a single land quadruped exists beyond 56° : all is one dreary, uninhabitable waste. In the north, coasts and valleys at equal distances from the equator are green with vegetation; in the south they are wastes of ice and snow.

The spread of the northern lands points us, as has been said, chiefly

to the causes of this difference. The plains of Siberia and of Northern America, warmed by the summer's sun, become centres of radiating heat; but the Antarctic lands, of small extent, isolated in the midst of frigid waters, and chilled by the cold sea-winds, act as constant refrigerators. In the north, icebergs are found in a few mountainous countries only; upon Antarctic lands they are more continuous, tower much higher, and their vast fragments perpetually maintain the low temperatures of the sea, detached bergs having been met with as near the equator as the mouth of the La Plata. In the latter regions no traces of warm currents have been observed beyond the fifty-fifth degree of south latitude; but in the north the well-known gulf stream carries its powerful influence as far as Norway, Spitzbergen, and Nova Zembla, thus making the northern zone, by comparison, an attractive scene of exploration and adventure.*

Arctic exploration may be said to have had at first but one purpose: to reach the Pole, and cross it from continent to continent; and this, indeed, has been the chief element in the polar problem for the last three and a half centuries. It is the purpose of this volume to refer briefly to the events giving rise to this problem, to the persistent efforts for its solution, and to the beneficial results secured by these seemingly useless labors. The Pole has not been reached, and may not be, and the short, navigable route is demonstrably impracticable. But the incidental results of exploration have far more than compensated for every expenditure of thought and money, for all of exposure and disappointment. For lessons in patience, self-sacrifice, and heroic endurance, few clearer examples can be drawn from the world's history than those to be found in the baffled attempts to reach the Pole. And yet the world has learned from these, that Providence, which shapes the destinies of men and nations, ordains that while men may fail to

* The remarkable phenomenon of the great difference between the two zones is accounted for by the meteorologist, Mr. Croll, on the ground that, in long lapses of time, their climates alternate, through the change in the eccentricity of the earth's orbit, in combination with the precession of the equinoxes. In both regions extensive fossil remains prove that a tropical or semi-tropical climate formerly existed. Our age is that of excess of cold in the Antarctic zone.

attain their first and perhaps less valuable aims, a larger reward often awaits their unrelinquished efforts.

The problem of the Pole and the northern passage had its birth at the great era of the discovery of America and of the new way to the Indies by the Cape of Good Hope; discoveries which snatched maritime commerce from its old seat in the Mediterranean and gave to the Spaniards and the Portuguese its almost exclusive control. These nations claimed not only the newly-discovered countries, but the right to the exclusive navigation of the ocean between them; and as the attempt by any other nation to enter those seas involved a war with either, or both, Spanish and Portuguese, the northern maritime nations began seriously to think of some shorter passages to the Indies which would give them commercial superiority. For the East, as the region of barbaric pearl and gold, ever loomed up before the mind as the land of unimagined riches, and a readier passage to it, as a feat of daring but of sure renown.

England led the way. "Having then no anticipation of becoming the sovereign of Hindostan, she hoped for a peaceful intercourse by a nearer avenue to southern Asia." Of this the old navigator, Sebastian Cabot, said, "When the news was brought that Don Christoval Colon had discovered the coasts of India, by his fame and report, there increaseth in my heart a great flame of desire to attempt some notable thing; and understanding by reason of the sphere (globe) that if I should sail by way of the northwest I should by a shorter tract come into India, I thereupon caused the king to be advertised of my device." At the later date of 1569, Martin Frobisher, "being persuaded of a new and nearer passage to Cataya (Cathay) than by Capo d'buona Speranza, which the Portugalles yeerly use, began first with himselfe to devise, and then with his friendes to conferre, and layde a playne platte unto them, that that voyage was not only possible by the northwest, but also, as he coulde prove, easie to be performed." It was "the only thing left undone in the world whereby a notable mind might be made famous and fortunate."

The voyages of the Cabots established the well-known right of England to the possession of the North American coast, securing for

the coming generations their great home of freedom, while French exploration under Verrazzani and Cartier secured a like claim for France on the regions north of the St. Lawrence, — a claim afterward happily absorbed under the domain of English law. A quarter of a century after Cabot's day, three attempts for the passage of the northwest having been tried in vain, a northeast course to Asia was sought by the fleet of Willoughby and Chancellor, which was to reach Cathay by doubling the northern promontory of Lapland. The admiral's fate was tragical. In his hoped-for shelter in a Lapland harbor he was found dead in his cabin, and his ship's company "dead in various parts of the vessel, alone or in groups." But his second officer, Chancellor, first for the English, entered the harbor of Archangel. It was "the discovery of Russia," or as a Spanish writer says, "a discovery of New Indies, — the commencement of maritime commerce between England and Russia, then one of the oldest and least mixed nations in Europe, but which was awakening from a long lethargy to emerge into political distinction."

The voyages of Davis (1585–86), on the third of which, when in lat. 75°, he was "in a great sea free from ice, neither was there any ice toward the north, but a sea free, large, and very salt and blue, and of unsearchable depth," added nothing to the discovery of the passage beyond the renewed conviction of that day that the way toward the north was without impediment. The same remark may be applied to the voyages of Barentz and Hudson and Baffin; the two last being made in the first quarter of the century following. Yet the experiences of the sturdy navigators on the northern Asiatic coast, and the opening up on the north of America of the great inland sea and of the estuaries, Smith's, Lancaster, and Whale Sounds, were further inducements for prosecuting the search.

Outside of the direct object named, large beneficial results were secured. The whale fisheries became the great object for which several nations competed; and the charts of Baffin and the voyages of Hudson led the way to this for the Dutch, and afterward for the English merchant. But from this date little of Arctic exploration for the Northwest passage was entered upon for a century.

The enterprise first attracted royal attention in the third quarter of the eighteenth century; George III., at the instance of the Royal Society of the Admiralty, sending out on expedition under Captain Phipps and toward the regions north of Spitzbergen. In his "Journal of a Voyage to the North Pole," the captain entered the sea "during a summer affording the fullest examination; but the wall of ice between latitudes 80° and 81° showed for more than twenty degrees not the smallest appearance of any opening." In this expedition, Nelson, then but fifteen years of age, exhibited a bravery and cool courage prophetic of his subsequent career.

Three years later, in July, 1776, Captain Cook sailed for the South Sea to make discoveries in the Pacific, and to return to England, as he hoped, by Behring's Strait. For, although the route to India by the Cape and the monopoly of commerce once enjoyed by Spain and Portugal had long before fallen into English hands, the northern passage was still sought, as promising a shorter and less expensive route; and an act was passed by parliament offering £20,000 to any vessel which should make the passage from continent to continent in either direction. Cook's ships were wholly unfitted to contend with northern ice. He discovered the Sandwich Islands and explored Behring's Strait, but was speedily driven back by the ice after reaching Icy Cape. From this date Arctic exploration, with the exception of the discoveries of Mackenzie and Hearne by land, the laudable efforts of the American colonists, and the attempts of the Russians to double their northern coasts, was again nearly suspended.

It is to the credit of the provinces of Virginia and Pennsylvania, and possibly of Rhode Island and of Massachusetts at a still earlier date, that the enterprise was not forgotten. The first note of these efforts here given does not belong to the region of authentic history, but is referred to as exhibiting indications of at least a more than probable knowledge of and sympathy with the object. The expeditions of the middle of the eighteenth century show that the colonies, even in their disjointed and feeble state, and in advance of the royal countenance of the undertaking, contributed their full share to it. It will be remembered that the London Company, as early as 1607,

instructed the Virginia colonists to seek a communication with the South Sea, and the famous Captain John Smith was taken prisoner in his ascent of the Chickahominy for that object. It was clearly the purpose of the colonists to find a water route to Asia if possible.

In the letter which follows these notices, the odd reference to "the parson" may perhaps be accounted for by remembering the old antagonisms between the Quaker and the officers of the Church of England.

EARLY AMERICAN VOYAGES.

I. A VOYAGE REPORTED TO HAVE BEEN MADE FROM BOSTON IN 1639. — Ellis, in his "Voyage of the Dobbs and California" says: —

"A Mr. Groseleiz, an inhabitant of Canada, a bold and enterprising man, and one who had travelled much in those parts, reached the coasts of Hudson's Bay from the French settlements. On his return he prevailed on his countrymen to fit out a bark for perfecting the discovery by sea; which being done, and he, landing on the coast, was amazed to find that some of his company had discovered an English settlement near Port Nelson. On his arrival there he found a party who told him they were part of a ship's crew from Boston; that they were set on shore to look for a place where the ship might winter."

To this statement, which is a condensation of Ellis' narrative, he adds in substance, —

"It is impossible to say whether this was the ship in De Fonte's account; but if it was, or if we should be wrong in this conjecture, it will still remain an incontestible proof that some attempts were made from Boston, when they were laid aside and forgot at London and Bristol."

De Fonte was the Spanish admiral spoken of by Thomas Jefferys in his "Great Probability of the Northwest Passage, 1768" as having been sent out to intercept the reported voyage of the ship from Boston, as a violation of Spanish right at the time when Spain enjoyed the exclusive route to the Indies. Snow, in his "History of Boston," treats the story of the admiral as a myth. The voyage was probably for trading purposes.

II. A trace of a better authenticated expedition is found in the "Gentlemen's Magazine," London, Nov. 1772, which says:—

"By a letter from James Wilder, captain of the *Diligence*, fitted out in Virginia by subscription, with a view to the discovery of the long-sought Northwest passage, it appears by the course of the tides there is a passage, but that it is seldom or never open, and he believes impassable. He sailed as high as $69^{\circ} 11'$, and discovered a large bay." To this voyage the "American Quarterly Review" of 1828, as well as Scoresby in his "Account of the Arctic Regions," and Macpherson in his "Annals of Commerce," Vol. III., refers at some length.

III. AN EARLIER AND ALSO UNDISPUTED ACCOUNT.—The narrative of most interest is that of the effort made under the auspices of Dr. Franklin, whose letter below notes it:—

PHILADELPHIA, Feb. 28, 1753.

... "I believe I have not before told you that I have provided a subscription here of £1500 to fit out a vessel in search of a Northwest passage. She sails in a few days, and is called the *Argo*, commanded by Mr. Swaine, who was in the last expedition in the California, and author of a Journal of that voyage in two volumes. We think the attempt laudable, whatever may be the success. If she fails, 'magnis tamen excidit ausis.' With great esteem,

BENJ. FRANKLIN."

Mr. CADWALADER COLDEN, N.Y.

Of this voyage the "Pennsylvania Gazette," "printed for Benjamin Franklin, postmaster, and D. Hall," November 15, 1753, says:—

"Sunday last arrived here the schooner *Argo*, Capt. Charles Swaine, who sailed from this port last spring, on the discovery of a Northwest passage. She fell in with ice off Cape Farewell; left the eastern ice and fell in with the western ice, in lat. 58° , and cruised to the northward to lat. 63° , to clear it, but could not; it then extending to the eastward. On her return to the southward, she met with two Danish ships bound to Ball river and Disco, up Davis Straits, who had been in the ice fourteen days off Farewell, and had then stood to westward and assured the commander that the ice was fast to the shore all above

Hudson's Straits to the distance of forty degrees out: and that there had not been such a severe winter as the last these twenty-four years that they had used that trade; they had been nine weeks from Copenhagen. The Argo, finding she could not get round the ice, pressed through it and got into the strait's mouth the 26th of June, and made the Island Resolution, but was forced out by vast quantities of driving ice, and got into a clear sea the first of July. On the 14th, cruising the ice for an opening to get in again, she met 4 sail of Hudson's Bay ships endeavoring to get in, and continued with them till the 19th, when they parted in thick weather, in lat. 62° and a half, which weather continued until the 7th of August. The Hudson Bay men supposed themselves 40 leagues from the western land.

"The Argo ran down the ice from 63° to $57^{\circ} 30'$, and after repeated attempts to enter the straits in vain, as the season for discovery on the western side of the Bay was over, she went on the Labrador coast, and discovered it perfectly from 56° to 55° , finding no less than six inlets, to the heads of all of which they went, and of which we hear they have made a very good chart, and have a better account of the country, its soil, produce, etc., than has hitherto been published.

"The captain says 't is much like Norway, and that there is no communication with Hudson's Bay through Labrador where one has heretofore imagined, a high ridge of mountains running north and south, about fifty leagues within the coast. In one of the harbors they found a deserted wooden house, with a brick chimney, which had been built by some English, as appeared by sundry things they left behind: and afterwards in another harbor they met with Captain Goff in a Snow (a three-masted vessel, the third mast abaft the mainmast, carrying a trysail) from London, who informed them that the same Snow had been there last year, and landed some of the Moravian Brethren, who had built that house; but the natives, having decoyed the then captain of the Snow and five or six of his hands in their boat round a point of land at a distance from the Snow, under pretence of trade, and carried them all off (they having gone imprudently without arms), the Snow after waiting sixteen days without hearing of them, went home and was obliged to take away the Mora-

vians to help to work the vessel. Part of the business this year was to inquire after those men. Captain Swaine discovered a fine fishing bank, which lies but six leagues off the coast, and extends from lat. 57° to 54°, supposed to be the same hinted at in Captain Davis's second voyage. No bad accident happened to the vessel, and the men kept in perfect health during the whole voyage and returned all well."

Not satisfied with the results of this attempt, Captain Swaine again sailed in the "Argo" the following spring, and the "Pennsylvania Journal and Weekly Advertiser" of Thursday, Oct. 24, 1754, published in Philadelphia, says:—

"On Sunday last arrived here the schooner Argo, Capt. Swaine, who was fitted out in the spring on the discovery of a Northwest passage, but having three of his men killed on the Labrador coast, returned without success."

The "Gazette" also says:—

"On Sunday last arrived the schooner Argo from a second attempt of a discovery of the Northwest passage, but without success."

In regard to this voyage, the Penn papers of the library of the Historical Society of Pennsylvania furnish the following

"Letter from Will. Allen, merchant, and, at a later date, Chief Justice of the Province of Pennsylvania, to the Proprietary, Thomas Penn."

PHILADELPHIA, November 18, 1752.

SIR,—As I am assured that everything that regards the interest and reputation of the Province of Pennsylvania will ever be regarded by you, I therefore beg leave to solicit your favor in behalf of myself and many other merchants of this place. Notwithstanding the repeated attempts of gentlemen in England to discover the Northwest passage without success, yet there has appeared among us a spirit to undertake that noble design, which, if effected, will redound to the honor of your province, and to the advantage of us, the undertakers.

By the enclosed papers, over which you will be pleased to cast your eye, you will perceive that last year we had intended to put our design

in execution, but by the extremity of the winter and other accidents it was postponed to the next year, at which time, as we have bought a vessel and all other material, and engaged a navigator and mariners here, we shall proceed in the affair and despatch the vessel from here the latter end of March, and are in great hopes, by avoiding mistakes of former attempts, and pursuing, as we think, more proper measures, to be able to effect the discovery of the passage, or, at least, put it out of doubt whether there is one or no. We have been the more encouraged in this attempt by the consideration that, in case our search for the passage should be fruitless, we might strike out a lucrative trade with the coast of Labrador; but we, to our great surprise, are informed we are like to be deprived of the proposed trade by means of a scoundrel of a parson, one James Sterling, who last summer took his passage to London, and there represented the advantage of the trade to the Labrador coast in such a light to Messrs. Hanbury, Buchanan, and others, that it is said they have applied to the Crown for an exclusive patent. This same Sterling, who is a Church of England minister at Newtown, Md., was concerned with us in the original undertaking, and subscribed to bear part of the expense; but after he had, by frequent conversations, extracted from the person we chiefly depend upon for executing the design all or chief part of the intelligence that he could give, he has been base enough to endeavor to circumvent us. As a proof of that I assert, I here enclose his original letter, wrote with his own hand, to Mr. Benjamin Franklin. We have also here our paper of subscription for the carrying on of the undertaking, signed by the said Sterling; notwithstanding which, as I said before, he made a voyage to London, and for his discovery and the proposals he laid before the above gentlemen, he has, though a parson, been rewarded with the collectorship of the customs at the head of the bay. We conceive ourselves very ill used by this false brother; have therefore presented a petition to his majesty, which comes herewith, praying that no patent for an exclusive trade be granted, which is humbly submitted to your consideration; and I am desired to request that you will please to get it presented if you judge it will answer any good end. The expense attending the solicitation, etc., I will take care of, with

thanks to discharge. Your kind interposition in our behalf will confer a favor on many of the most considerable merchants of this place, and particularly on

Your most obedient, humble servant,

WILL. ALLEN."

Mr. Bancroft, in his "History of the United States," Vol. IV., p. 141, indorses the fact of the voyages last named. In Jeffery's volume of 1768 will be found the statement that a Captain Taylor, in a sloop of about thirty-five tons, was met with July 9, 1753, in about latitude 56° north, which sloop had been fitted out in Rhode Island to go in pursuit of a northwest passage and, if not successful, to come down on the coast of Labrador.

RENEWAL OF THE SEARCH.

The explorations suspended by the ill-success of past efforts and yet more by the existence of the long period of the wars in Europe, were renewed four years after the peace of 1815. Its history from that date is so closely connected with the name of Sir John Franklin, the search for whom occasioned its revival in the United States, that it will best evolve itself in the story of his career. The efforts of Kane and Hall for the rescue of the lost explorer, and the noble seconding of these by Mr. Henry Grinnell, of New York, under the auspices of the U. S. Government, hold a place among the deeds of humanity which the world honors.

Sir John Franklin, the youngest of four sons of Willingham Franklin, merchant, was born April 16, 1786, at Spilsby, Lincolnshire. His father, designing him for the church, gave him a classical and mathematical education, but the first sight of the ocean so vividly excited the boy's imagination that he determined to be a sailor. His father, thinking that this childish caprice would be cured by a taste of sea life, shipped him on a merchant vessel to Lisbon, but on his return found him more than ever a lover of the sea. He obtained for him a midshipman's warrant on the "Polyphemus," of seventy-four guns,

commanded by Captain Lawford, under whom the young officer took part in the battle of Copenhagen, 1801.

In 1803, he was attached to the "Investigator," on the survey of the coasts of New Holland, setting out on his return from which cruise he was shipwrecked, with his brother officers and crew, on a desolate sand-bank, scarcely four feet above the water, and rescued at the end only of fifty days' suffering. At the battle of Trafalgar, where he acted as signal officer on the "Bellerophon," he was distinguished for his coolness and intrepidity in the hours of greatest danger, when surrounded by the dead and wounded. The remainder of his active service was on the coast of Portugal, on the Brazil station, and in the Gulf of Mexico. His ship in 1808 carried the royal family of Portugal to Brazil, when forced into hasty exile from Lisbon. In the war between the United States and Great Britain, at the battle of New Orleans, he was slightly wounded while in command of the "Belford's" boats, and for his brilliant conduct in this action was made first lieutenant of the "Forth." This ship, at the restoration of the Bourbons, carried the long-exiled Duchess d'Angoulême, daughter of Louis XVI., back to France.

From this date his talents were chiefly enlisted in the field of Arctic exploration, which connects itself with this history. English efforts to reach the Pole and find the Northwest passage were about to be revived. The reports made by Scoresby of the existence during the two preceding years of open water to the extent of two thousand square leagues in the Greenland Sea, between the seventy-fourth and eightieth degrees, north latitude, with like reports of the breaking up of the ice barrier on the north, excited the attention of navigators. The Admiralty, influenced by the suggestions of Sir John Barrow, and of Sir Joseph Banks, who, as a scientific man, stood high with the government, prepared two new expeditions, and Sir Joseph Banks designated Franklin as second in command of one of these. Both expeditions were unsuccessful, finding, after reaching the eightieth degree of north latitude, in place of the open Polar sea, through which it was hoped they could make a short journey to Behring's Strait, an impenetrable line of ice. After their five months' cruise the "Dorothea"

and the "Trent" returned to Deptford, October 22, 1818. Admiral Beechey, who had served with Franklin in the "Trent," has given a vivid account of the strong desire of Franklin to continue the cruise, even after the receipt of very serious injury to his ship.

In the year following, he left Gravesend on a merchant ship of the Hudson Bay Company, for a land journey to the northern shores of America, which he was to explore in co-operation with Parry, who was despatched, with two vessels, to Lancaster Sound. The whole northern coast at that date had been explored at but two isolated points, the mouths of the Coppermine and the McKenzie. Accompanied by Dr. Richardson, Midshipmen Hood and Back, and a few Orkney men, he reached York Factory, from the city of New York, August 13, and thence, by a journey of seven hundred miles, arrived at Fort Cumberland in October, and wintered the first year on the Saskatchewan, and the second on "the barren grounds"; in the following summer he descended the Coppermine River, and surveyed five hundred and fifty miles of the sea-coast eastward. From York Factory to the return to it by land and water, the journey was one of five thousand five hundred and fifty miles.

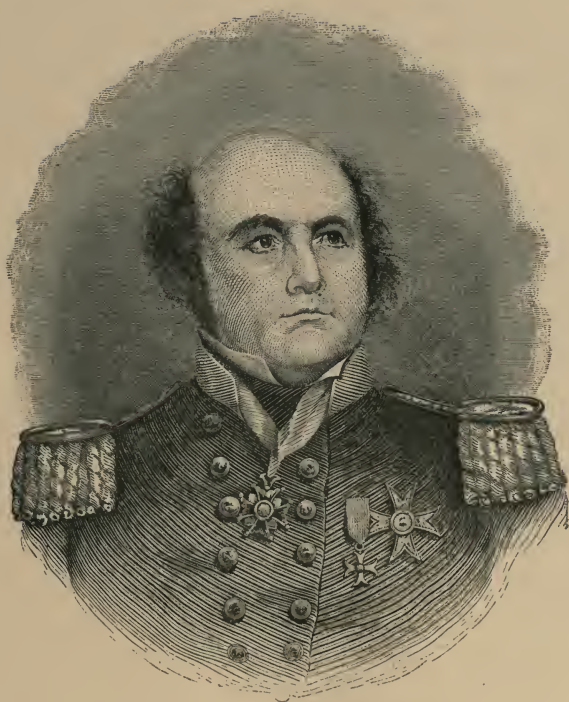
In his second land expedition, 1825-27, he descended the McKenzie, and traced the coast line through thirty-seven degrees of longitude to near the one hundred and fiftieth meridian. The English government, appreciating the services of one who, through great danger and suffering, had carried these expeditions over nine thousand miles, and added to the charts twelve hundred miles of the northern coast-line, knighted him in 1829. He also received the honorary degree of D.C.L. from the University of Oxford, was awarded the great gold medal from the French Geographical Society, and was elected a member of the Academy of Sciences, Paris.

As governor of Tasmania, 1836-43, he accomplished much for the advancement of the colony, — among other benefits founding the Royal Society of Tasmania at Hobart-Town, the meetings of which were held in the Government-house, and the papers printed at his expense. By a singular coincidence, among the Antarctic expeditions visiting the colony he had occasion to welcome the "Erebus" and "Terror," the ships

with which his own name was afterwards to be so pathetically connected.

FRANKLIN'S LAST EXPEDITION.

On his return to England, in 1844, he found the Admiralty exercised on the subject of a new Arctic expedition, proposed by the Royal Society at the instance of Sir John Barrow. He claimed the command, and was appointed. On this occasion the first lord of the Admiralty had said to Sir Edward Parry, "I see that Franklin is sixty years of age; ought we to permit him to go out?" to which Parry replied, "He is the ablest man I know, and if you do not send him he will certainly die of despair." Franklin himself said, when asked, "Can you not repose on the laurels won in such good service for your country?" "My lord, I am but fifty-nine." "He appeared," says La Roquette, "as jealous of a few months of his age, when it was a question of exposure to great danger, or of executing a work of difficulty or suffering, as a woman would be of being thought older than the parish register showed." The prestige of Arctic service, and of his brilliant experiences, brought around him a crowd of volunteers for the new expedition in search of the Northwest passage, and, supported by a body of officers conspicuous for talent and energy, and a crew largely chosen from the whaling service, he left England, in command of the "Erebus" and "Terror," May 19, 1845. In his judgment, the solution of the problem of the passage was now to connect Parry's furthest westing of $113^{\circ} 48' 22''$, made in 1819, either with Behring's Strait or southward with Simpson's Strait. Franklin's instructions were framed (in conjunction with Sir John Barrow, and upon his own suggestions) by the eminent explorers with whom his former work had closely connected him. The experience of Parry made it evident that a fresh attempt to force ships through the heavy ice seen by him to the southwest of Melville Island would be futile, as has since been fully proved. On the other hand, Franklin's surveys of the north coast of America had long before satisfied him that a navigable passage existed along it, from the Fish River to Behring's Strait. Of the western entrance to Simpson's Strait he had been accustomed to say, "If I



John Franklin

could only get down there my work is done; it is all plain sailing to the westward."

The expedition of 1845 consisted of the "Erebus," three hundred and seventy tons, screw, Captain Sir J. Franklin commanding, with Commander J. Fitz-James and Lieutenant G. Gore; and the "Terror," three hundred and forty tons, screw, Captain F. R. M. Crozier and Lieutenant E. Little.

It comprised in all one hundred and thirty-four officers and men, with a transport ship to carry additional stores to Disco, Greenland. The "Erebus" and "Terror" were victualled for three years, and furnished with every appliance of that day; much of the provisions, however, proving at a later date to have been of a quality most unfortunate for the success of the enterprise. Within the second week of July the transport took on board for her return the last letters ever received from officers or crew. Franklin's last was as follows:—

"WHALE FISH ISLAND, BAY OF DISCO, 11th July, 1845.

"MY DEAR SISTER, — . . . The appearance, dress, and manners of the Esquimaux bespeak that care is taken of them by the government. Several of them can read the Bible with ease, and I am told that when the families are all collected the children are obliged to attend school daily. I looked into one of the huts arranged with seats for this purpose. When the minister comes over from Disco he superintends the school; at other times the children are taught by a half-caste Esquimaux. How delightful it is to know that the gospel is spreading far and wide, and will do so till its blessed truths are disseminated through the globe. Every ship in these days ought to go forth to strange lands bearing among its officers a missionary spirit; and may God grant such a spirit on board this ship. It is my desire to cultivate this feeling, and I am encouraged to hope we have among us some who will aid me in this duty. We have divine service twice on each Sunday, and I never witnessed a more attentive congregation than we have. May the seed sown fall upon good ground, and bring forth fruit abundantly to God's honor and glory.

"Ever your affectionate brother,

JOHN FRANKLIN."

Two days before, he had written, "I hope that my dear wife and daughter will not be anxious if we should not return by the time they have fixed upon. . . . Without success in our object, even after the *second winter*, we should wish to try some other channel, should the state of our provisions and the health of our crews justify it."

The fullest anticipations of success were indulged in by officers and men. Some, in their letters home, went so far as to speak of answers being directed to them to ports on the Asiatic coast. Lieutenant Fairholme, of the "Erebus," wrote, "On board we are as comfortable as it is possible to be. I need hardly tell you how much we are all delighted with our captain. He has, I am sure, won not only the respect, but the love of every person on board by his amiable manner and kindness to all; and his influence is always employed for some good purpose, both among officers and men. He is in much better health than when we left England, and looks ten years younger." The gallant Fitz-James had also written to Mr. John Barrow, Jr., "I am convinced that he is the most capable of all men of commanding an expedition which demands profound judgment and large experience."

From the date of these letters no direct news from the ships was ever received, except the reports of Captains Dannet and Martin, of the whalers, "Prince of Wales" and "Enterprise," who spoke them, July 26, of the same year, in Melville Bay, north latitude 77° 48', east longitude 66° 13'. On that day "everything was going on well; officers and men busily shooting the birds—the auks—which surrounded them, to add to their provision stores, augmenting these by a full supply for nearly two years."

RELIEF EXPEDITIONS.

Although no real public anxiety as to the fate of the vessels was felt in England for the two years following, preparations began to be made for the possible necessity of succoring the explorers; and, time still passing without tidings, expedition after expedition was despatched in quest, regardless of cost or hazard, Sir John's heroic wife taking in these such a part as to ennoble her name for all time. The

American explorations of Kane and Hall, which are closely connected with the object of these expeditions, are included in the following tables. The lines of search, and the chief localities examined may be traced on circum-polar map No. 1 (pocket). The tables have been arranged to show that the search for Franklin was carried on by expeditions which, within about the same periods, visited the northern coasts, some from Behring's Strait and some from Baffin's Bay, supplemented by land explorations, chiefly along the middle section of the continent. The private expeditions closed the search (Table IV.) by McClintock's voyage in the "Fox."

TABLE I.

ENGLISH AND AMERICAN EXPEDITIONS FOR THE RELIEF OF SIR JOHN FRANKLIN, 1848-1859. FROM THE WEST THROUGH BEHRING'S STRAIT.

Years.	Vessels.	Commanders.	Line of Search and Coasts Examined.
1848-52	Plover . . }	Commander Moore . Captain Maguire . .	{ Through Behring's Strait, beyond Point Barrow, to lat. 73° 51', N. long. 163° 48' W., with a boat expedition from the Plover up the Mackenzie River, and east to Cape Bathurst; Mr. R. Sheddon in his yacht "Nancy Dawson" rendering assistance.
1848-49	Herald . .	Captain Kellett . .	{ Discovered Herald Island, and visited and named a part of the land reported by Wrangell.
1850-55	Enterprise . Investigator, <i>Supply Ships.</i>	Captain Collinson . Commander McClure,	{ Coast of North America, from Behring's Strait to Dease Strait and coast of Banks' Land. Investigator abandoned June 3, 1853, in the Bay of Mercy, on the north coast of Banks' Land. Commander McClure crossed on the ice to Dealy Island to the Resolute and Intrepid, and returned across the Atlantic to England.
1851-52	Dædalus .	Captain Wellesley .	{ Parliament gave £10,000 to him and his officers.
1853	Amphitrite,	Captain Frederick .	
1853	Rattlesnake,	Commander Trollope,	
1853	Diligence .	Lieutenant Elliott .	
1854	Trincomalee,	Captain Houston . .	

TABLE II.

FROM THE EAST THROUGH BAFFIN'S BAY.

Years.	Vessels.	Commanders.	Line of Search and Coasts Examined.
1848-49	Enterprise . Investigator,	Sir J. C. Ross . . . Captain Bird . . .	{ North and west coast of North Somers- et; north shores of Barrow Strait and the shores of Prince Regent's Inlet.
1849-50	North Star . <i>Supply Ship.</i>	Master Saunders . .	{ Landed provisions on one of the Wol- laston Islands.
1850-51	L'y Franklin, Sophia . .	Captain Penny . . . Captain Stewart . .	{ Coasts of Cornwallis Island and shores of Wellington Channel.
1850-51	Resolute . . Assistance . . Pioneer . . Intrepid . .	Captain Austin . . . Captain Ommaney . . Lieutenant Osborn . . Lieutenant Cator . .	{ South coasts of Parry Islands, and the passages between them, north, west, and east coast of Prince of Wales Island to long. 103° W., lat. 72° N.
1850-51	Advance . . Rescue . .	Lieutenant DeHaven, U.S.N. Master Griffin, U.S.N.	{ First Grinnell expedition: shores of Wellington Channel; discovered Grinnell Land.
1852-54	Assistance . . Resolute . . Pioneer . . Intrepid . . North Star .	Sir E. Belcher . . . Captain Kellet . . . Lieutenant Osborn . . Lieut. McClintock . . Captain Pullen . .	{ Shores of Wellington Channel and the coasts of Melville and Prince Patrick Islands; the Assistance, Resolute, and Pioneer, and Intrepid abandoned Aug. 26, 1854; the Resolute picked up at sea, lat. 64° 40', long. 61° 30', Sept. 11, 1855, by Capt. James Buddington, of New London, Conn., brought to the United States, and presented to England by joint resolution of United States Congress of Aug. 28, 1856; delivered to Queen Vic- toria by Commander Hartstene, U.S.N., Dec. 16, of the same year.
1853	Phenix . . Breadalbane,	Command'r Inglefield Lieutenant Fawckner	{ Shores of Wellington Channel; landed stores at Cape Riley; returned with part of McClure's command; Lieut. Bellot, of France, perished in the ice Aug. 17, 1853; the ship lost at Cape Riley Aug. 21, 1853.
1853-55	Advance . .	Dr. Kane, U.S.N. . .	{ Second Grinnell expedition, Smith's Sound, lat. 82° 27' N.
1854	Phenix . . Talbot . .	Command'r Inglefield Commander Jenkins,	{ Returned to England from Beechey Island, with part of Belcher's and Mc- Clure's command.
1855	Release . . Arctic . .	Lieutenant Hartstene U.S.N. Lieutenant Simms . U.S.N.	{ Ships sent out for relief of Dr. Kane; found him on his return at Lieveley or Godhaven, Greenland.

TABLE III.
LAND EXPEDITIONS.

- 1848-49—Sir John Richardson and Dr. Rae searched the coasts of North America between the Mackenzie and the Coppermine Rivers. (Dr. Rae, under the Hudson Bay Company, in 1846-47 made a voyage of discovery from Fort Churchill to the Gulf of Boothia, surveying the gulf to Fury and Hecla Strait on the east, and Lord Mayor's Bay of Sir James Ross on the west, determining there an isthmus.)
- 1849—Dr. Rae reached Cape Krusenstern.
- 1849-51—Lieut. W. J. S. Pullen from the Plover. (See Table No. I. for boat expedition.)
- 1851—Dr. Rae: coasts of Wollaston Island and east coast of Victoria Land, to lat. 70° N., long. 101° W.
- 1853-54—Dr. Rae: coasts of Boothia Isthmus; obtained relics of Franklin's expedition. (Rewarded by vote of Parliament.)
- 1855—J. Anderson and J. G. Stewart: west coast of Adelaide Peninsula.

TABLE IV.

PRIVATE EXPEDITIONS ORGANIZED UNDER SUBSCRIPTIONS BY LADY FRANKLIN,
CAPTAIN ROSS, LIEUTENANTS MCCLINTOCK, YOUNG, AND OTHERS.

Years.	Vessels.	Commanders.	Line of Search and Coasts Examined.
1850-51	Felix . . . Mary . . .	Sir John Ross . . . Commander Phillips .	{ A portion of Cornwallis Island. (Dr. E. A. Goodsir, brother of the surgeon of the Erebus, in the whaler Advice in 1849 also searched Baffin's Bay and Lancaster Sound.
1850	Prince Albert	Commander Forsyth,	{ Found Barrow Strait and Prince Regent's Inlet blocked with ice; coasts of Prince of Wales Island and North Somerset.
1851-52	Prince Albert	Captain Kennedy . . Lieutenant Bellot . .	{ Shores of Prince Regent's Inlet and Bellot's Strait. Lieutenant Bellot of France was second in command.
1852	Isabel . . .	Command'r Inglefield,	{ Westenholme, Whale, Smith's, Jones', and Lancaster Sounds, and Baffin's Bay. (Captain Kennedy, in 1853, sailed in the Isabel for Behring's Strait; voyage abandoned at Valparaiso.)
1857-59	Fox . . .	Captain McClintock .	{ Completed survey of North Somerset, Prince of Wales Island, Boothia, Felix Peninsula, and King William Land, finding many relics of Franklin's expedition, and obtaining at Point Victory the only record as yet discovered.

This last expedition, under McClintock, brought from the cairn at Point Victory, on King William Land, a tin cylinder containing the record.

The finding of this paper and the expedition itself, were the result of Lady Franklin's last effort to discover the fate of her husband. To this object she dedicated all her available means, and, aided by sympathizing friends, had purchased and fitted out the "Fox," in which McClintock sailed. The paper was found by Lieut. Hobson in a cairn twelve miles from Cape Herschel, and, with a large number of relics obtained at this and other points, it was deposited in the Museum of the United Service Institution, Whitehall Yard. The discovery of this paper first definitely made known the fate of the party,—an issue generally apprehended in England from the time of Rae's discoveries in 1854, for the relics which in that year he had brought from the Eskimos were articles of personal property of the



BAROMETER OF FRANKLIN'S EXPEDITION,
Found by C. F. Hall, on King William Land, in 1869.

officers, including Sir John Franklin's own star of the Order of Merit, with the motto, "*Nec aspera terrent*," G. R. III., MDCCCXV.

Notices of the earlier relics discovered, traces of the missing ships, and of the relics afterward recovered from the Eskimos by Hall and Schwatka, will appear in their proper places in the Narrative. It will be sufficient here to state the results of the expedition and the accredited awards.

At the meeting of the Royal Geographical Society of London, May 28, 1860, the president, Earl de Grey and Ripon, presenting the founder's gold medal to Lady Franklin, expressed the decision of the Society in the words: "It is now demonstrated that the 'Erebus' and 'Terror' ascended Wellington Channel to the seventy-seventh degree of north latitude; that the two ships were navigated round Cornwallis Land, which was thus proved to be an island; and that finally, steering from Beechy Island to the southwest, they were, on the 12th of September, 1846, beset in the ice, in which they wintered, in latitude N. 70° 5', and longitude W. 98° 23', having reached a position never before or since attained by any other ship."

“In placing the ‘Erebus’ and ‘Terror,’ in 1846, in this position, it is clear that the Franklin expedition, whose commander, with others, had previously ascertained the existence of a channel along the north coast of America, with which the frozen sea, wherein he was beset, had a direct communication, had, in a geographical sense, firmly established the existence of a Northwest passage.”

At the same meeting the Patron’s Medal was awarded to Captain (now Admiral) F. L. McClintock, the President saying for the Society, “All the devotion of a Lady Franklin, and the efforts of the British nation, might well have failed in unravelling the fate of the ‘Erebus’ and ‘Terror,’ had not such a commander been selected for the ‘Fox.’”

A monument costing two thousand pounds, erected in Waterloo Place, London, bears the inscription:—

FRANKLIN.

To the Great Navigator
and his brave Companions
who sacrificed their lives
completing the Discovery of
The Northwest Passage,
A.D. 1847-48.

Erected by the unanimous vote
of Parliament.

This statue, voted by the nation, was unveiled in the presence of the first lord of the admiralty, Sir J. Packington, and of the distinguished Arctic explorers and geographers, Collinson, Ommaney, Sabine, Murchison, Osborn, and Rawlinson, Mr. John Barrow, Mr. Arrow-smith, and others, with Lady Franklin, who declared the likeness of her husband excellent and characteristic. He is represented as informing his officers and crew that the Northwest passage has been discovered. A panel represents Crozier reading the funeral service over Franklin in 1847.

In 1875 a beautiful monument, ordered by Lady Franklin, who inspected it shortly before her death, was placed in Westminster Abbey. It is of Carara marble, having in bas-relief an ice-bound ship, and the inscription, —

“O ye frost and cold! O ye ice and snow!
Bless ye the Lord!”

Followed by Tennyson's lines:—

“Not here: the white North has thy bones, and thou,
Heroic Sailor Soul,
Art passing on thy happier voyage now
Toward no Earthly Pole.”

And concluding with the words:—

“Erected by his widow, who, after long waiting, and sending many in search of him, herself departed to find him in the realms of life.”

The facts which these and other memorials commemorate being unknown, as has been said, until the year 1859, America heartily joined in the relief expedition of 1850, to which, in connection with subsequent American explorations, this narrative now turns.



CHAPTER II.

THE GRINNELL EXPEDITIONS. — REVIVING ARCTIC EXPLORATION. — PRESIDENT TAYLOR'S MESSAGE TO CONGRESS TRANSMITTING CORRESPONDENCE WITH LADY FRANKLIN. — RESOLUTION AUTHORIZING THE EXPEDITION APPROVED MAY 5, 1850. — MR. GRINNELL'S MEMORIAL SUPPORTED BY CLAY, SEWARD, AND PEARCE, IN THE SENATE. — OFFICERS OF THE FIRST EXPEDITION. — INSTRUCTIONS OF SECRETARY PRESTON TO DeHAVEN, WHO SAILS FROM NEW YORK MAY 22, 1850. — DISPATCHES FROM ST. JOHNS AND THE WHALE-SHIP ISLANDS. — DeHAVEN'S REPORT OF THE GRAVES FOUND AT BEECHEY ISLAND. — HE ARRIVES AT GRIFFITH ISLAND. — DRIFTS NORTHWARD. — GEOGRAPHICAL DISCOVERIES. — EASTWARD INTO BAFFIN'S BAY. — FREED FROM THE ICE JUNE 10, 1851. — AGAIN RELEASED, AUG. 18. — SAILS FROM HOLSTEINBORG, SEPT. 6. — ARRIVES AT NEW YORK, SEPT. 30.

THE records of the State and Navy Departments show that each of these voyages in search of Franklin is to be credited to the special and long-cherished interest of Mr. Henry Grinnell, of New York, who, to the very last, entertained a hope of the safety of the missing navigators. Lady Franklin, in two letters dated April 4 and December 11, 1849, respectively, had addressed President Taylor soliciting the aid of the United States Government in the search. In the first letter she expressed her gratification at the respect and courtesy received on her visit to the United States three years previously, and especially at the interest which she had found to be felt in the enterprise in which Sir John was known to be engaged. Referring also in brief to the British expeditions sent out since the year 1847 in proof that her own Government "had not forgotten the duty to brave men sent on a perilous service," Lady Franklin adverted to the fact that the Admiralty reward of twenty thousand pounds for any efficient assistance had been offered too late for the British whalers, who had then already sailed. She therefore looked "with more hope to the

American whalers, both in the Atlantic and Pacific, as competitors for the prize, being well aware of their strength and bold spirit of enterprise." She added, "I venture to look even beyond these: I am not without hope that you will deem it not unworthy of a great and kindred nation to take up the cause of humanity which I plead, in a *national* spirit, and thus generously make it your own." Cherishing the hope that the Russian Government would send out exploring parties from the Asiatic side of Behring's Strait, she said: "It would be a noble spectacle to the world if three great nations, possessed of the widest empires on the face of the globe, were thus to unite their efforts in the truly Christian work of saving their perishing fellow-men from destruction."

To this letter the Secretary of State, Mr. Clayton, replied for the President, that the appeal was such as would strongly enlist the sympathy of the rulers and the people of all portions of the civilized world.

"To the citizens of the United States, who share so largely in the emotions which agitate the public mind of your own country, the name of Sir John Franklin has been endeared by his heroic virtues and the sufferings and sacrifices which he has encountered for the benefit of mankind. The appeal of his wife and daughter, in their distress, has been borne across the waters, asking the assistance of a kindred people to save the brave men who embarked in his unfortunate expedition; and the people of the United States, who have watched with the deepest interest that hazardous enterprise, will now respond to that appeal by the expression of their united wishes that every proper effort may be made by this Government for the rescue of your husband and his companions.

"To accomplish the objects you have in view, the attention of American navigators, and especially of our whalers, will be immediately invoked. All the information in the possession of this Government, to enable them to aid in discovering the missing ships, relieving their crews, and restoring them to their families, shall be spread far and wide among our people; and all that the Executive Government of the United States, in the exercise of its constitutional powers, can

effect to meet this requisition on American enterprise, skill, and bravery, will be promptly undertaken.

"The hearts of the American people will be deeply touched by your eloquent address to their chief magistrate, and they will join with you in an earnest prayer to Him whose spirit is on the waters, that your husband and his companions may yet be restored to their country and their friends."

In addition to the reward offered by the Admiralty, Lady Franklin had herself offered the sum of three thousand pounds, or a proportion thereof, according to the services rendered, to such ship or ships as should afford effectual relief to any portion of the expedition. In her second letter of December 11, at which date Sir James Ross had returned without the discovery of even a trace of the expedition, she again appealed to the President for his recommendation of national assistance, with the plea that, "until the shores and seas of the frozen regions had been swept in all directions, or until some memorial should be found to attest their fate, neither England, who sent them out, nor even America, on whose shores they had been launched in a cause which had interested the world for centuries, would deem the question at rest."

January 22, 1850, President Taylor, in a message to Congress, transmitted the correspondence which has been here named. The President said that he had anxiously sought the means of affording assistance, but was prevented from accomplishing the object in consequence of the want of vessels suitable to encounter the perils of a proper exploration, the lateness of the season, and the want of an appropriation. All he could do was to cause the advertisements of reward promulgated by the British Government, and the best information he could obtain as to the means of finding the lost ships, to be widely circulated among American whalers and seafaring men. The propriety and expediency of an appropriation was submitted to Congress. A board appointed by the Secretary of the Navy had reported to him that no ships were ready for such an expedition or could be equipped in season, and that there seemed to be no constitutional power to authorize an equipment.

The message of the President, referred in the House to the Naval Committee, brought from the chairman of that committee, Hon. F. P. Stanton, a favorable report in the form of a Joint Resolution, by which the President was authorized "to accept and attach to the navy two vessels offered by Henry Grinnell, Esq., to be sent to the Arctic Seas in search of Sir John Franklin and his companions," and to "detail from the navy such commissioned and warrant-officers and seamen as may be necessary for said expedition, and who may be willing to engage in it. The said officers and men shall be furnished with suitable rations for a period not exceeding three years, and shall have the use of such necessary instruments as the departments can provide. The said vessels, officers, and men shall be in all respects under the laws and regulations of the Navy of the United States until their return, when the vessels shall be delivered to Henry Grinnell. Provided that the United States shall not be liable to any claim for compensation in case of the loss, damage, deterioration, use, or risk of the vessels."

The Resolution, reported April 25, was passed by the House on the following day, and by the Senate May 1; it was approved by the President May 5, 1850.

Lady Franklin, on her visit to the United States, had been the guest of Mr. Grinnell, whose interest in Arctic explorations had been first aroused by a letter from her to a citizen of New York, asking whether something could not be done in the United States towards the rescue, and had been increased by frequent letters subsequently received from her.

In the early spring of 1850, assisted by the hearty good-will and personal labors of Lieutenant M. F. Maury, U.S.N., Superintendent of the then "National Observatory," he presented the following memorial to Congress:—

"The interest felt in the fate of the Franklin expedition is not confined to the country under whose flag it sailed. Commerce and science, not less than philanthropic benevolence, are deeply interested in the efforts now making for the discovery of the missing navigators. While so deep and generous a sympathy pervades the civilized world on this

subject, your memorialist feels strongly desirous that some effort be made by his country to signalize its zeal in such a cause. Entertaining a confident belief in the safety of the expedition, and that the gallant men who have so nobly risked their lives in the cause of geographical science may yet be rescued and restored to their country and their families, the earnest desire of your memorialist is to contribute something to so beneficial a result. Moved by these considerations, he has prepared and is now fitting out two vessels of the proper size, and with the needful appointments to proceed with all dispatch to the polar regions.

"He has been permitted to call on the officers of the Navy for volunteers to take charge of this expedition. This call has been answered with a zeal and nobleness of spirit beyond praise, without the promise or hope of reward; Lieutenant DeHaven, assisted by Passed Midshipman Griffin as second in command, has been selected to take command of the expedition.

"It is the opinion of this officer and of others that it is of the first importance that the expedition be placed under naval laws during the term of its service. Your memorialist, therefore, prays for the needful legislation at an early date, in order that time may be afforded for the necessary action consequent upon it.

"Your memorialist has from his own resources provided for the principal expenses of the expedition. It would strengthen his hope of ultimate success, and facilitate greatly the object in view, if the act of Congress should authorize the word to be passed in the navy for volunteers among the men, as well as the officers, limiting to fifteen the number for each vessel. Should the pay and naval rations be deemed insufficient by the crew, your memorialist wishes to give from his own purse such additional sums as may be proper and satisfactory to the volunteers.

"The two vessels now purchased and fitting out are of ninety-one and one hundred and forty-four tons' burden respectively. Every proper means will be taken to insure strength and durability, and power to overcome all obstacles in the way of success. The paramount inducement to this expedition on the part of your memorialist is the

rescue of Sir John Franklin and his companions, but he shall think it due to science to instruct the officers in command to use all diligence and zeal in the exploration of the frozen region to which they are bound.

“There are good grounds for believing this to be a propitious season for such an exploration, and he shall not easily relinquish the hope of his being in some degree instrumental in solving the long-disputed question of the Northwest passage from the Atlantic to the Pacific.

“Hoping that your honorable body will give the subject an early and favorable consideration, your memorialist will ever pray, etc.

(Signed)

“HENRY GRINNELL.”

Henry Clay, in presenting the memorial, which secured the passage of this resolution, said of Mr. Grinnell, “I am proud of the manner in which the mercantile classes of our country administer in all great enterprises the wealth which they have acquired in the pursuit of business. Among the most eminent of these merchants stands the gentleman whose petition I present.

“I am very much afraid that the unfortunate person and his companions whose fate Mr. Grinnell and the world are so anxious to learn will be found to be no more. But if the enterprise should fail to discover their existence, or even their fate, the attempt will be gratifying to the whole world; and if nothing whatever is discovered in respect of them, useful discoveries may be made, which will add to the amount of information we possess, and amply repay any expenditure that may be incurred by our granting the prayer of the petitioner.”

To the objections made by Senators King and Foote, that it is inconsistent with the dignity of the Government to mix itself up thus with a private enterprise, and that it would be better for the United States to send out its own expedition, it was replied by Senators Miller and Seward that, owing to the lateness of the season, this was not practicable, and that the vessels would become national vessels for the time in which they would be engaged, naval discipline being asked for by the memorialist as a necessity; further, that all our enterprises are

more or less carried into execution, not by the direct action of the Government, but by lending its aid and countenance to individuals, corporations, states, colleges, or universities.

To the objection raised by Senator Jefferson Davis, that it is improper to appropriate money for the purpose, of the error of which opinion he said he "could only be convinced by its being shown that this Government is not a *corporation formed by the States*, with limited powers and for specific purposes," no reply appears to have been made.

SAILING OF THE FIRST EXPEDITION, MAY 22, 1850.

On the 15th of May, 1850, Secretary Preston gave to Lieutenant DeHaven his instructions. The lieutenant, in expectation of the passage of the resolution by Congress, had been in New York for several weeks, and had been closely occupied in fitting out the two ships offered by Mr. Grinnell. The expedition consisted of the brigantines "Advance," 144 tons, and the "Rescue," of 91 tons burden. It was the opinion of experienced officers that vessels of about these dimensions, drawing not above ten feet of water, would answer as well as larger ships the purpose of a careful search. They were officered as below:—

"Advance."

Lieutenant Edward J. DeHaven, commanding the expedition.

Passed Midshipman William H. Murdaugh, first officer

Midshipman William J. Lovell, second officer.

E. K. Kane, M.D., passed assistant-surgeon.

"Rescue."

Acting Master Samuel P. Griffin, commanding.

Passed Midshipman Robert R. Carter, acting master and first officer.

Boatswain, Henry Brooks, second officer.

Benjamin Vreeland, M.D., assistant-surgeon.*

* OFFICERS' RECORD.—E. J. DeHaven entered the navy as midshipman, Oct. 2, 1829; promoted to be passed midshipman, July 3, 1835; lieutenant, Sept. 8, 1841; retired, Feb. 6, 1861; died, May 1, 1865. Samuel P. Griffin entered the service as midshipman,

Lieut. DeHaven had seen nearly twenty years' naval service, and had passed through something of a like experience with that seemingly now before him when in command of the "Flying Fish," one of the vessels of the United States exploring expedition of 1838, in the Antarctic Ocean, under Lieut. (late Admiral) Wilkes.

In the instructions from the Navy Department for the expedition, Secretary Preston suggested as the outline of its course that the ships, after passing Barrow's Straits, should turn their attention northward to Wellington Channel, and westward to Cape Walker, and should then be governed by circumstances, — sailing either in concert or separately. They were to enter and search every headland, promontory, and conspicuous point for signs or records of the missing party; but on no account was the safety of officers or ships to be hazarded by unnecessary exposure. Should Lieutenant DeHaven find it impossible to reach Barrow's Straits, he was to turn his attention to Jones' and Smith's Sounds; and if these were found to be either closed or impenetrable, and he should fail to secure any trace of the missing expedition, he must return to New York, as the season would probably be then too far advanced for any further attempt to be made. A like provision for avoiding a second winter in the Arctic regions instructed him that, if after entering the strait he should be unable to penetrate sufficiently far into the unexplored regions to gain a position from which operations could be favorably commenced in the season of 1851, he was to endeavor to escape from the ice, and return.

Sept. 9, 1841; promoted to be passed midshipman, Aug. 10, 1847. William Murdaugh entered the service as midshipman, Sept. 9, 1841; promoted to be passed midshipman, Aug. 10, 1847; master, Sept. 14, 1855; lieutenant, Sept. 16, 1855; resigned, April, 1861. William J. Lovell entered the service as midshipman, Nov. 8, 1847; promoted to be passed midshipman, June, 1853; master, Sept. 15, 1855; lieutenant, Sept. 16, 1855; resigned, May 3, 1859. R. R. Carter entered the service as midshipman, March 30, 1842; promoted to be passed midshipman, Aug. 15, 1848; master, Sept. 15, 1855; lieutenant, Sept. 16, 1855; resigned, May, 1861. Dr. E. K. Kane entered the service as assistant-surgeon, July 21, 1843; promoted to be passed assistant-surgeon, Sept. 14, 1848; died in Havana, Feb. 16, 1857. Dr. B. Vreeland entered the service as assistant-surgeon, May 9, 1850; promoted to be passed assistant-surgeon, March 30, 1857; surgeon, April 26, 1861; died, March 26, 1866.

The chief object of the expedition—the search for Sir John Franklin—required that for this he should use all diligence, and make every exertion, offering assistance, and communicating his plans and route to any British parties engaged in a like search whom he might meet.

He was, however, to pay attention to subjects of scientific inquiry, but not to allow such attention to interfere with the main object. In view of the facts elicited by Lieutenant Maury in support of the theory of a Polynia, or “open sea,” beyond the icy barrier, in which investigation Lieutenant DeHaven had shared, his instructions had in view the hope of an entrance into that basin. And should he possibly penetrate beyond the barrier so far as to make it more prudent to go on than to turn back, he was to push forward and put himself in communication with any of the United States forces serving in the waters of the Pacific, or in China. The officers there stationed were instructed to be ready, in such event, to offer to him every facility. Notwithstanding his instructions on these and other points, DeHaven was permitted to depart from them, if on arriving out he should find that by so doing his search would probably be more effectual.

At the Brooklyn navy-yard the expedition received every aid in the way of equipment usually furnished from special naval stores, and in addition Mr. Grinnell provided far more for the object and comforts of the expedition than was asked for by its officers. The vessels themselves Dr. Kane has described as, perhaps, more thoroughly adapted for Arctic service than any previously fitted out. The hull was double, a brig within a brig, an outer oak sheathing of two and a half inches being covered with a second of the same material, strips of heavy sheet-iron extending from bow to beam. The decks were double, and made water-tight by an interlined packing of tarred felt, and the entire interior was ceiled with cork.

“Forward, from keelson to deck, was a mass of solid timber for seven feet from the cutwater; and to prevent the ice from forcing in her sides, an extra set of beams ran athwart her length at intervals of four feet, so arranged as to ship or unship. From the Samson-posts, shores

* diverged in every direction, with as many hanging and oblique oaken knees as the space permitted. The rudder could be taken on board and replaced again in four minutes. In all respects, everything about the two vessels bore the marks of intelligent foresight and unsparing expenditure."

Of the nautical equipment, the chronometers were especially approved; several of them having been carefully tested at the Observatory, one under charge of Passed Midshipman Murdaugh varying on the cruise, from May 18, 1850, to October 3, 1851, 10 min. 45 sec. By the aid of Professor Loomis, Kane had collected some instruments for thermal and magnetic registration; his private journal furnishes a meteorological abstract of more than thirty pages for his narrative of the expedition. The two ships left the navy-yard May 22, crowds upon the wharves, and cheers from ferry-boats, steamers, and ships showing the popular sympathy until the Battery was passed. Off Sandy Hook friends on board left for home, Mr. Grinnell and his sons continuing to bear company with the ships in a pilot-boat to a point reached on the 25th, seventy-five miles further east.

The commander said, in his farewell report to the Department, that all were well, and seemingly inspired with the right spirit for the success of the expedition. Officers and crews were volunteers; and it is to their lasting credit that the late Admiral Sherard Osborn, one of the most distinguished of British Arctic navigators, should have been able to say, "I was charmed to hear that before sailing, officers and men had signed a bond not to claim, under any circumstances, the £20,000 reward which the British government had offered. We, I am sorry to say, had acted differently." The "Advance" reached St. Johns, Newfoundland, June 8, and DeHaven reported that the east winds and several gales had occasioned slow progress; he had not unwillingly parted with the "Rescue," whose slower sailing qualities had additionally detained him. The Whale-fish Islands were to be the rendezvous. Arriving at these on the 29th, he reported that on the east coast of Newfoundland many icebergs had been met, in striking against one of which, in lat. 49° 3', the "Advance" had lost a jib-boom. From that date he had a clear sea within one hundred miles of

the islands; the "Rescue," by steering further east, had seen but few icebergs.

From the islands, officers and men once more sent home their letters by the storeship of Commodore Austin's squadron there, out in the search; their next and last were sent from Port Leopold, Beechey Island, August 23, no further opportunity offering until their return to New York, October 4, 1851.

The history of the expedition from the date of August 29 appears in the report of the commander, made on his return, and more in detail in Dr. Kane's narrative of the first United States Grinnell expedition. To Dr. Kane the world is indebted for the graphic history of each expedition, as well as for his brilliant services in both. His singular qualifications for each calling are best referred to in the following brief sketch, drawn chiefly from his biography, written by Dr. William Elder, of Philadelphia.

Born in Philadelphia, February 20, 1820, he early developed a frame fitted for athletic exercises, but showed tendencies to disease which, it will be seen, manifested themselves throughout his whole life to a degree which would have shut out from active duty any one not exercising the iron will exhibited.

Seemingly unappreciative of the value of systematic study until his sixteenth year, he then distinguished himself at the University of Virginia by his pursuit of an elective course in the natural sciences, and, during the short period which his health permitted, aided Professor Rogers in his investigation of the geology of the Blue Mountain range. A long and severe illness caused him to withdraw from the university, but on his recovery he entered on the study of medicine at the University of Pennsylvania, graduating at the head of his class in his twentieth year, with the honor of having his theme, on a special subject in medicine, requested for publication by the Faculty.

Dr. Kane entered the naval service July 21, 1843, and in the same year sailed on board the United States frigate 'Brandywine,' Commodore Parker, as surgeon to the United States embassy to China, under the late Mr. Caleb Cushing. Touching at Rio Janeiro, he had the opportunity of examining the geological character of the eastern

Andes, and on the arrival of the ship at Bombay, of visiting the famous caverned temples of Elephanta, and of crossing the Ghauts at Kandalah, and exploring the cave temples of Karli, passing thence to Ceylon.

He remained in connection with the embassy until the close of its work by the treaty of July, 1844, and then, procuring a substitute, crossed to the Philippines, traversed the island of Luzon from Manilla to the Pacific coast, and descended the volcano of Tael—a feat but once before attempted by a foreigner, and then without success. By this descent he subjected himself to an encounter with the natives, who considered it a profanation.

After three and a half years' private practice as surgeon at Whampoa, on his recovery from the rice fever, he sailed in January, 1845, for Singapore, and thence for Alexandria, visiting some of the wonders of Egypt. He was seized with the plague, on recovering from which he made a restorative foot journey in Greece, and later examined the glaciers of the Alps of Switzerland, to which he afterward had occasion to make frequent references in his ice theories of the Arctic regions.

In May following he was again on board ship, under orders for the coast of Africa, on which voyage—although, when the fever had broken out on board, he had written of his good health—he was stricken down, and sent home invalided by Dr. Dillard, the surgeon of the fleet.

When convalescent, he was an early applicant for duty in Mexico. The war between the United States and that country had witnessed the surrender of the capital. Dr. Kane was selected by President Polk to be the bearer of an oral dispatch to the general-in-chief, which had three times failed in its delivery from the War Department. He was ordered also to make special investigations of facts relating to the field and hospital organizations of the American army for the War Department.

Threading his way through the Mexican country, he received a severe lance wound in an encounter with a party of Mexicans, from the effect of which he lay ill until July following in Philadelphia. In

February, 1849, he was again on naval service on board the storeship "Supply," and returned to Philadelphia from the Mediterranean in September. His next service, the year following, was again on the Mexican coast, on duty for the United States Coast Survey.

His application for duty on the first Grinnell expedition was long unanswered, probably from the record of his past frequent severe illnesses; but, at the moment of entire despondency, he was placed under orders, in the manner which he himself best describes as follows: "On the 12th of May I received one of those courteous little epistles from Washington, which the electric telegraph has made so familiar to naval officers. It detached me from the Coast Survey, and ordered me to proceed forthwith to New York, for duty on the Arctic expedition. Seven and a half days later I had accomplished my overland journey of thirteen hundred miles, and in forty hours more our squadron was beyond the limits of the United States. The Department had calculated my travelling time to a nicety." It was certainly the exhibition of most exceptional characteristics, that one who had the ever-present consciousness of liability to prostration by disease should apply for and enter with such alacrity on duty within the rigors of the Arctic zone. But it was a service congenial to his nature, and in keeping with his varied experiences in other regions. His future records will show with what skill he turned all those experiences to good account, applying the resources gained from the natural sciences, and from explorations in other zones, to the widely different life on which he now entered.

June 17, 1850, when the ships drew near Davis' Straits, they found themselves near Cape Farewell on the east, and Frobisher's Meta Incognita on the American side. The Arctic days began, the thermometer being read at night without a lantern, and the sun setting at ten, to rise again before two. On the 24th the sun did not pass below the horizon. The words night and day began to be meaningless, and the soothing influence of darkness was missed at the bed-hour. But the regular calls for rising and for meals were steadily observed. In common with all others resident or voyaging in the Arctic regions,

officers and crew now found within themselves the power of adaptation to their new circumstances; without this power, light and darkness during the periods of the zone could not be endured.

From the Whale-fish Islands the passage to Lancaster Sound was to be made by one of the three crossings, — the south, the middle, or the northern.

By the first of these, vessels reach the American side south of 68° . It is but the alternative for whalers when failing to cross the North Water. Attempts of the middle passage are rare. In 1819, Parry first crossed it in seven days, but, on repeating the experiment, July, 1824, was forced to turn northward, and did not reach the open water till September. The north passage passes westward from the ice of Melville Bay, through a comparatively open area, known as the North Water, and through this, ships generally reach the highway of Arctic search. This crossing was now the object of the expedition. The bay itself, ice-clogged and full of danger, had been, since its opening in 1819, the scene of the loss of two hundred and ten ships.

The time for reaching the North Water varies, as DeHaven well knew, with the season. Parry's delay was to be contrasted with that of the five days of Sir John Ross in 1829; Austin, now out in the search, was found to have been kept back forty-five days; and it may be mentioned here that eight years afterwards, McClintock, in the "Fox," passed a dreary winter in the pack. "Nothing," he said, "is more uncertain than ice navigation; one can only calculate upon the chances." Avoiding the middle passage, on the 6th of July DeHaven was in lat. $72^{\circ} 54'$, beating to windward, between the pack and the land; on the 8th he was boring and sometimes warping—"helplessly fast." After an imprisonment of twenty-one days, during which he had made an average northern progress of about a mile a day, a steady north and northwest breeze began to relax the ice, and on the 10th of August he was crossing Melville Bay. Midday gave them the warm skies of the Mediterranean, and on the 18th the expedition reached its most northern point in Baffin's Bay, latitude $76^{\circ} 25'$, the next day entering Lancaster Sound. Crowding all sail for Port Leopold, Beechey Island, they now had the pleasant sight of two of the

relief ships of that year, the "Felix," Sir John Ross, and the "Prince Albert," Captain Forsyth. In concert with these officers, the first traces of the missing ships were now found.

From Port Leopold, DeHaven reported to the Department that he had found little difficulty in forcing his way to that point until he had reached latitude 74° , where the ice had closed, and was continuous along the land, so that northward progress was barred, while a clear and wide opening to the west tempted his course in that direction. After a run of forty miles, however, the ships were wedged, and remained so till July 29, when the ice suddenly opening, and a southeast wind springing up, they forced their way into clear water, and, after another detention in latitude 75° , longitude 60° , pushed on to Cape York, and on the 19th of August were in the North Water. Meeting soon after Captain Penny's ships, he resolved to touch at Port Leopold with them. Here he met with an unexpected discovery.

In his final report he says: "On the 25th of August, 1850, off Cape Riley, the 'Advance' was hove to, and a boat sent ashore to examine a cairn erected in a conspicuous position. It was found to contain a record of H.B.M. ship 'Assistance,' deposited the day before, containing the information that Captain Ommaney, R.N., had discovered traces of an encampment, and other indications of a camping-ground of some civilized or hunting party. Fragments of painted wood and preserved-meat cans were also picked up on the low point of the Cape. Our speculations at once connected them with the object



THE CROW'S NEST.

of our search. Captain Griffin, of the 'Rescue,' had shared in these discoveries."

Of these traces Kane says, that although they were meagre indications, the conclusion they led to was irresistible. Bird-bones and the rib of a seal were found in a centre, around which a party seemed to have sat eating, and with the tins were other relics, such as pieces of a garment, and parts of a boat, apparently collected for kindling wood. These could not have been the work of Eskimos, and Parry, the only European who before this had visited the Cape, had not encamped here. The indications were those of a land party from Franklin's squadron.

DeHaven pressed onward along the eastern shore of Wellington Channel. Passing Beechey Island, and running through a narrow lead, he found the ice above Point Innes fixed and unbroken from shore to shore—generally eight feet thick, the sharp, angular hummocks rounded down by the action of the weather. Further progress to the north was out of the question. Returning to Point Innes for security until a favorable change should take place, he found himself, on the 27th, in company with two English commands—Sir John Ross's and Penny's.

Captain Penny, in company with Dr. Goodsir, brother of an assistant-surgeon on board the missing vessels, here reported that they had found, between Cape Spencer and Port Innes, scraps of newspaper of the date of 1844, with other paper fragments bearing the name of an officer, and other small articles of personal wear. Consulting with Ross and Penny, a joint search was then instituted along shore in all directions. In a short time one of Penny's men reported the discovery of graves, and the commanders, DeHaven, Penny, and Phillips, joined by a party from the "Rescue," after a weary walk, found the three memorials which follow. They were painted headboards, with inscriptions cut by the chisel:—

"Sacred to the memory of
W. BRAINE, R.M.,
H.M.S. EREBUS.
Died, April 3, 1846,
aged 32 years.

'Choose ye this day whom ye will serve.'—Joshua ch. xxiv. 15.

“ Sacred to the memory of
JOHN HARTNELL, A.B., of H.M.S.

EREBUS,
aged 23 years.

‘ Thus saith the Lord, consider your ways.’ — Haggai ii. 7.

“ Sacred to the memory of
JOHN TORRINGTON,
who departed this life, Jan’y 1, A.D. 1846,
on board of
H.M. Ship TERROR,*
aged 29 years.”

These sad memorials, with a series of mounds filled with fragmentary remains (some of them written astronomical and other notes), and especially rows of six hundred preserved-meat cans, proved beyond dispute that the missing ships had made some stay here. The cans had been emptied, and filled with limestone pebbles, probably to serve as ballast on boating expeditions. At Cape Riley and Beechey, another cairn, found in a conspicuous position, was dug round in every direction, and between the hills, which come down towards Beechey Island, the searching parties of the “Rescue,” and Mr. Murdaugh of the “Advance,” found the tracks of a sledge clearly defined, and unmistakable, both as to character and direction, pointing to the eastern shores of Wellington Sound. Additional proofs of Franklin having organized sledge parties were found in the tracks of sledge runners

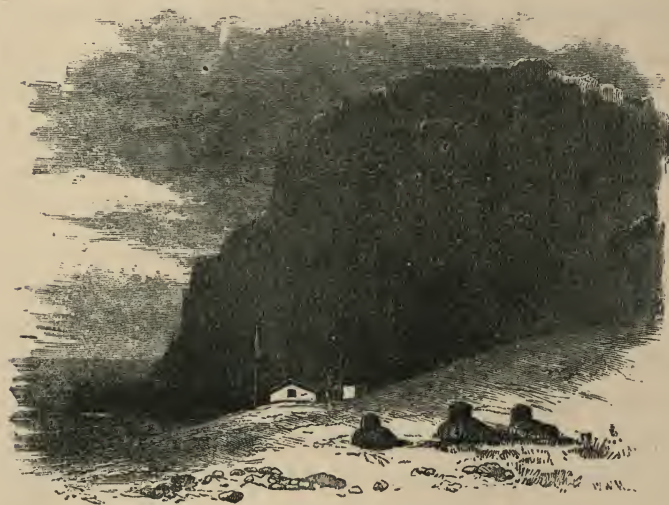
* In 1858 Lieutenant McClintock placed here a marble tablet, which had been constructed in New York, under the direction of Mr. Grinnell, by request of Lady Franklin, and which Captain Hartstene, U.S.N., in 1855, had been unable to take to this place. A small tablet is also to be found here, sent out by Mr. John Barrow, in memory of Lieutenant Bellot, of France, who went out as volunteer in the English expedition of 1853, and perished in the ice. Lady Franklin’s monument reads :—

“ FRANKLIN,
CROZIER, FITZJAMES,
and all their
gallant brother officers, and faithful
companions who have suffered and perished
in the cause of science, and the
service of their country,
THIS TABLET
is erected near the spot where
they passed their first Arctic
winter, and whence they issued
forth to conquer difficulties or
TO DIE.”

still visible in the limestone crust and upon snow-slopes; on which Kane remarks, "It was startling to see the evidences of a travel nearly six years old preserved in intaglio on so perishable a material. The alternations of congelation and thaw give to the Arctic snows at times an ice-like durability, but these traces had been covered by the after-snows of five winters."

These few memorials of the navigators, so long lost to history, were all that told of them. Not a written memorandum could be found,

or a pointing cross, or even the vaguest intimation of the intentions entertained by Franklin when at this point. His route was to be learned only from the explorations to be made at a much later date by McClintock. The world can



THE THREE GRAVES.

never know anything of the written notices which, according to his instructions, Franklin was to deposit at this place.

From the date of these most interesting discoveries DeHaven endeavored to push westward and northward, reaching Barlow's Inlet September 4, and passing through a lead along the south side of Cornwallis Island, where the English searching vessels were descried, fast in the ice. This western lead, however, closing, he was also compelled to make fast, and the ice being exceedingly unfavorable for further progress, and the season far advanced, after consultation with the commander of the "Rescue," he decided that according to his instructions, as they "had not gained a point from which advantageous operations

could be commenced," it was an imperative duty to extricate the ships and return home. September 13, he signalled to the "Rescue" to cast off.

But the return within that season was quickly overruled by forces utterly beyond control. After leaving their English friends, the two ships of Lieutenant DeHaven were caught fast in the new ice in the midst of Wellington Channel, and although the wind for a short season bore from the north and east, the drift began steadily to set northward up the channel. Through the whole of October and November the changing winds drifted them helpless to and fro, but never drove them out of the strait. From December 1, the eastward drift brought them by January 14 into Baffin's Bay. Here the ice around the vessels soon became again cemented and fixed, but the ships kept driving southward along with the whole mass until the close of the first week in June. Cut out as usual with saws, axes, and crowbars, and with the rudders again shipped, they then forced their way into an open, clear sea in latitude $65^{\circ} 30'$; and the "Advance" a second time cast anchor at Disco on the 17th of July; the "Rescue," which had more than once suffered severely, coming in next day.

From Disco the ships touched again at Proven and Upernavik. Alternately closed in, and then with hard labor released, they finally left Holsteinborg for New York September 6, 1851. The commander, referring to the instructions, which enjoined him not to spend, if it could be avoided, more than one winter in the Arctic regions, had of necessity resolved to give up the search, "with sad hearts that our labors had served to throw so little light upon it." His reports and Kane's narrative dilate at large on the traces of Franklin which have been described, and upon their disappointments at two later dates, at each of which the hope of renewed efforts had lingered.

The first of these was at the beginning of the winter of 1850-51, when they found they were not fixed, as they had hoped to be, in a position from which operations could be carried on by travelling parties in the spring: "the ships were fast being set out of the region of search." The remaining disappointment was at the close of August of the second year, when the ships stood again to the northwest in the

Greenland Sea, but the lead before them closing at the distance of a few miles, and the ice appearing as unfavorable as ever, they did not deem it prudent to run the risk of being again beset, and considered that even if successful in crossing the pack, it would be too late to attain a point as far west as had been reached the year previous.

Important geographical discoveries had been secured. Dr. Kane's journal of September 21 and 22, at the date named, reads: "When in latitude 75° north, the sky being clear, and the position of the sun favorable, I saw distinctly, bearing north by west, a series of hilltops (not mountains), apparently of the same configuration with those around us, and separated from Cornwallis Island by a strip of low beach, or by water and land to the north and west; its horizon that of low ground, without bluffs, and terminating abruptly at its northern end. Still further on to the north came a strip without visible land again, with mountain tops distant and 'rising above the clouds.'" To this large mass of land visible between northwest to north-northeast, which DeHaven also distinctly observed, he gave the name of Grinnell Land; to the peak bearing north-northeast, and distant about forty miles, the name of Mount Franklin; and to an inlet discovered by Acting Master Griffin, in a land excursion, the name of Griffin Inlet. In May of the following year these were seen and visited by one of the officers of Captain Penny. On the admiralty charts and those issued by the United States hydrographic office, Penny's Strait and Grinnell Land will be found laid down.

When the American expedition had found itself at Murdaugh Islet, near Cornwallis Island, a wide channel appeared before them, leading to the westward, the frost smoke hanging over which seemed to indicate a large area of open water in that direction, and the signs of animal life were abundant. To the channel appearing to lead into this supposed sea DeHaven gave the name of "Maury," in remembrance of the investigations on the theory of "an open polar sea," to which the instructions of the Secretary had referred him as having shared at the Observatory. The conjectures made by the expedition that Franklin had passed up this channel were afterwards confirmed; his return through it, and southward drift, added nothing in favor of the theory.

It had been an additional disappointment to DeHaven and his officers that, after sight of the westward channel and its indications, he was debarred from pressing forward in the direction in which he believed the greatest chances for success in the search existed, and also from entering within the mysterious basin.

The Secretary of the Navy, in his report of November 29, 1851, said:—

“The expedition under Lieutenant-Commanding DeHaven to the Arctic seas, in search of the British commander, Sir John Franklin, and his companions, returned to the port of New York in October, having discovered only supposed traces of the objects of which it was in quest, and leaving in entire uncertainty their actual fate. The vessels of the expedition proceeded in the direction where, in the opinion of the best-informed officers, the missing navigators are to be sought, and on which the traces in question were found. Though failing in the main object of their search, Lieutenant DeHaven and his officers verified by their explorations many facts before unknown to science, but indicated in the course of investigations carried on at the Naval Observatory, concerning the winds and currents, and to which reference was made in instructions for the expedition.

“In this expedition the officers and men were all volunteers; in its prosecution they encountered the greatest dangers and hardships. To mention a single example: their vessel was caught by the ice and frozen up in the open sea, in which perilous situation they were confined for nine months, and drifted to and fro in the ice for more than a thousand miles. By the skill of the officers, and the mercy of a superintending Providence, they were released from their imprisonment, and restored to their country and friends, not a man having been lost in the expedition. They have received no other pay than would have been due on a cruise to Naples or the Levant, and I would respectfully suggest that they be allowed the same pay and emoluments that were granted to those in like positions in the last expedition to the South seas.

“Mr. Henry Grinnell, the owner of the vessels employed by Lieutenant DeHaven, has generously offered them for another cruise in

search of Sir John Franklin, should Congress think proper to order a second expedition."

No condensation can be justly made of the graphic notices journalized by Kane of the natural features of the Arctic zone, its icebergs, hummocks, and floes, and especially its glaciers; of the beautiful displays of refraction and the auroras; or of the fauna and flora examined. The forms of the glacier and berg, in their fantastic varieties and swift transformations and disappearance, frequently brought to his mind memories of the objects visited with such pleasure in the Old World. This will appear by a single extract:—

"July 5, 11 P.M. A strip of horizon, commencing about 8° to the east of the sun, and between it and the land, resembled an extended plain, covered with the *débris* of ruined cities. No effort of imagination was necessary for me to travel from the true watery horizon to the false one of refraction above it, and there to see huge structures lining an aerial ocean margin. Some of rusty, Egyptian, rubbish-clogged propyla, and hypæthral courts; some tapering and columnar, like Palmyra, Baalbec; some with architrave and portico, like Telmessus or Athens, or else vague and grotto-like, such as dreamy memories recalled of Ellora and Carli.

"I can hardly realize it as I write; but it was no trick of fancy. The things were there half an hour ago. I saw them, capricious, versatile, full of forms, but bright and definite as the phases of sober life. And as my eyes ran round upon the marvellous and varying scene, every one of these well-remembered cities rose before me, built up by some suggestive feature of the ice.

"An iceberg is one of God's own buildings, preaching its lessons of humility to the miniature structures of man. Its material, one colossal Pentelicus; its mass the representative of power in repose; its distribution simulating every architectural type. It makes one smile at those classical remnants which our own period reproduces in its Madeleines, Walhallas, and Girard Colleges, like university poems in the dead languages. Still, we can compare them with the iceberg; for the same standard measures both, as it does Chimborazo and the hill of Howth. But this thing of refraction is supernatural through-

out. The wildest frolic of an opium-eater's reverie is nothing to the phantasmagoria of the sky to-night. Karnaks of ice, turned upside down, were resting upon the rainbow-colored pedestals; great needles, obelisks of pure whiteness, shot up above their false horizons, and, after an hour-glass-like contraction at their point of union with their duplicated images, lost themselves in the blue of the upper sky.

"While I was looking—the sextant useless in my hands, for I could not think of angles—a blurred and wavy change came over the fantastic picture. Prismatic tintings, too vague to admit of dioptric analysis, began to margin my architectural marbles, and the scene faded like one of Fresnel's dissolving views. Suddenly, by a flash, they reappeared in full beauty; and, just as I was beginning to note in my memorandum-book the changes which this brief interval had produced, they went out entirely, and left a nearly clear horizon."

The display of such weird and ever-changing scenery in the arch above him, happily for the time being, takes from the Arctic explorer all sense of even the extreme peril in which he is placed. A noted instance of this will be found in the experience of the officers of the "Jeannette," as cited in Chapter X. of this volume. In the case especially of Lieut. Chipp, it is some little consolation to remember, that during so many hours of the fearful imprisonment of the ship, his official duty lay in observations of phenomena attractive and elevating, and of high value in scientific inquiry.

No occupation, however, in which Dr. Kane engaged was permitted to interfere with his services as medical officer to the expedition, and these were called into most active requisition during the winter of 1851, when the dreaded scurvy assailed every officer and many of the crews. His commander reported that every case was kept under control by the unwearied attention and skilful treatment of the medical officers, and that it was in a great measure owing to the advice and the expedients recommended by the senior officer that the expedition was able to return without the loss of a man. Kane himself was down with the disease, and his old wound became discolored and painful; but out on the floes his energies were excited and his blood

warmed, and he tramped away freely. The powers of endurance and of restoration from repeated attacks of disease enabling him thus to save others, and to prepare himself for a renewed exploration, were those not ordinarily possessed or shown to the world. They were kept alive, doubtless, by the iron will-power within, and by the variety of pursuits of his every-day life, — the observations, during all hours, of the wonders of nature; the pursuit of game, whenever opportunity offered, and the familiarizing himself with the movements of the ships, and the duties of their navigation pertaining to the executive and the watch officer. By this last experience he fitted himself to command in person the second expedition, in which he was soon to awaken an interest in the United States.





E. K. KANE, M. D., SURGEON OF THE FIRST GRINNELL EXPEDITION;
COMMANDER OF THE SECOND.

Author of "The U. S. Grinnell Expedition under DeHaven," 1850-52; of "Arctic Explorations," 1853-55. Assistant Surgeon in the Naval service, July 21, 1843; promoted to be Passed Assistant Surgeon, Sept. 14, 1848; Medallist of the Royal Geographical Society of London, and of the Société de Géographie of Paris. Died at Havana, Feb. 15, 1857.

CHAPTER III.

THE SECOND GRINNELL EXPEDITION (1853-55).

THE EXPEDITION DESIGNED BY KANE.—CONTRIBUTORS.—PAPER READ BEFORE THE GEOGRAPHICAL SOCIETY OF NEW YORK.—ASSISTANCE BY THE SECRETARY OF THE NAVY.—OFFICERS OF THE “ADVANCE.”—FISKERNAES.—CROSSING MELVILLE BAY.—THE “ADVANCE” MOORED TO AN ICEBERG.—RENSSELAER HARBOR.—PROVISION DEPOTS FOR SPRING EXPLORATIONS.—THE OBSERVATORY.—DAILY SHIP-LIFE.—MORTON’S REPORTED POLAR SEA.—THE BRIG FIXED IN THE ICE.—ATTEMPT TO REACH BEECHEY ISLAND.—NINE OF THE COMPANY LEAVE FOR THE SOUTH; THEIR RETURN.—SCURVY.—THE BRIG ABANDONED.—BOAT AND SLEDGE JOURNEY SOUTHWARD.—RESCUE OF KANE BY CAPTAIN HARTSTENE AT DISCO.—ARRIVAL AT NEW YORK.—REPORTS TO THE DEPARTMENT.—SUMMARY OF RESULTS.—APPRECIATION BY THE BRITISH GOVERNMENT.—PUBLICATIONS OF THE NARRATIVE.—KANE’S FAILING HEALTH.—REQUEST OF LADY FRANKLIN TO HIM TO UNDERTAKE A NEW EXPEDITION.—HE SAILS FOR ENGLAND.—RETURN VOYAGE.—DEATH.—FUNERAL HONORS AT HAVANA, NEW ORLEANS, CINCINNATI, COLUMBUS, BALTIMORE, AND PHILADELPHIA.—KANE’S RELIGIOUS CONFIDENCE.

THE second American expedition in search of the lost navigators is to be credited chiefly to Dr. Kane. It was made under the auspices of the Navy Department, the Smithsonian Institution, the Geographical Society of New York, and the American Philosophical Society; with contributions from a number of other scientific associations and friends of science, chiefly in Boston, New York, and Philadelphia. Professors Henry and Bache, and Lieutenant Maury again rendered efficient aid. Mr. Grinnell placed the “Advance” at Kane’s disposal, making further contributions in money and supplies, and Mr. Peabody, of London, paid down the sum of ten thousand dollars. Kane himself freely contributed from his private means and from the proceeds of his lectures.

For months after his return with DeHaven he had occupied himself in maturing the scheme of a renewed effort to rescue the missing party, or at least to solve the mystery of their fate. "The object of my journey," he said, "is the search after Sir John Franklin; neither science nor the vainglory of attaining an unreached *North* shall divert me from this one conscientious aim." He could not realize that some of the party might not yet be alive; that some small squad, or squads, aided by the Eskimos of the expedition, might not have found a hunting-ground, and laid up from summer to summer enough of fuel and food and seal-skins to brave three, or even four more winters in succession. Even at a late date on this second voyage he wrote, "If four months ago, surrounded by darkness and bound down by disease, I had been asked the question, 'Can they have survived?' I would have turned towards the bleak hills and the frozen sea, and responded, in sympathy with them, 'No!' But with the return of light, a savage people came down upon us, destitute of any but the rudest appliances of the chase, but fattening on the most wholesome diet of the region, only forty miles from our anchorage, while I was denouncing its scarcity.

"In my opinion, the vessels cannot have been suddenly destroyed, or, at least, so destroyed that provisions and stores could not have been established in a safe and convenient dépôt. With this view, which all my experience of ice sustains, comes the collateral question as to the safety of the documents of the expedition.

"If the natives reached the seat of the missing ships of Franklin, and there became possessed, by pilfer or by barter, of the articles sent home by Rae and Anderson, this very fact would explain the ability of some of the party to sustain life among them. If, on the other hand, the natives have never reached the ships, or the seat of their stores, and the relics were obtained from the deserted boat, then the central stores or ships are unmolested, and some may have been able, by these and the hunt, even yet to sustain life."

At the meeting of the Geographical Society of New York, December 14, 1852, he read a paper developing his plan of search. It presented the inducements of *terra firma* as the basis of operations,—a due northern line to lead soonest to the open sea, animal life to sustain

travelling parties, and the co-operation of the Eskimos. He believed in the probable extension of the land masses of Greenland to the far North; that its highest protruding headland would be most likely to afford some traces of the lost party; and that the approximation of the meridians would make the access from the point reached to the West as easy as from Wellington Channel, and access to the East far more easy. The Northern point he hoped to attain would be two hundred and twenty miles north of Beechey Island, and seventy miles north of the highest then reached in Wellington Channel. He would pass up Baffin's Bay to this most northern point, and then press on towards the Pole as far as boats or sledges could carry a select party of not more than twenty — "a picked crew."

In support of his belief of the extension of Greenland to the far North, Kane adduced, among other arguments, the analogy between its general contour and that of the Southern Peninsulas of the world, specially in reference to their inward concave bend on the Western side — toward the interior. He made a strong point of the increasing elevation of the Greenland peaks from South to North. The basis of his belief in the existence of an Open Polar Sea, as confirmed by this second expedition, will receive subsequent attention in this volume.

The lectures excited much interest. At Washington, the officers of the Government had listened with close attention, some of the Senators committing themselves to the support of a Bill for an appropriation for the voyage. But although Congress did not fail to appreciate the results of the first expedition, — providing, by an Act of the later date of August 31, the pay of fleet-surgeon for its senior medical officer, with that of the next higher rank to others, and additions to the compensation of warrant and petty officers and crew, — no appropriation was made for this expedition.

Despairing of receiving aid from Congress, Kane unfolded his plans to Secretary Kennedy, to whom he had been specially commended by the Chief of the Smithsonian and the Superintendents of the Coast Survey and the Observatory, as possessing peculiar qualities and varied sources of knowledge fitting him for the Exploration. The Navy Department promptly encouraged him. The Secretary did not hesitate

to say that he would assist with every means authorized; bringing the expedition under the control of the Government by placing him on special duty to conduct it under the direction of the Department. He detailed for him ten men from the Naval Service, on their usual pay and rations, and furnished some nautical instruments, maps, and charts, and a few provisions.

In his brief orders of November 27, 1852, and February 9, 1853, the Secretary referred to the solicitation of Lady Franklin that Kane should undertake the Expedition; and, placing him on special duty for "the conduct of an overland journey from the upper waters of Baffin's Bay to the shores of the Polar Seas," invited his attention to Scientific inquiry, particularly to the existence of an open sea, and to the subjects of terrestrial magnetism, general meteorology, and natural history. No specific instructions, usual on the departure of Naval expeditions, were offered. The Secretary added, "Relying on your zeal and discretion, the Department sends you forth on an undertaking which will be attended with great peril and exposure; trusting that you will be sustained by the laudable object in view, and wishing you success and a safe return to your friends."

May 30, 1853, the "Advance" left New York on her second cruise, having on board seventeen persons. Dr. I. I. Hayes, of New York, was the surgeon, August Sontag, its astronomer, and Henry Brooks, of the first Expedition, second in command; of the seamen, William Morton also had been with DeHaven and Kane. The equipment of the brig consisted of little more than a quantity of rough boards for housing the vessel in winter, some tents of india-rubber and canvas, and several carefully built sledges. Kane had some two thousand pounds of pemmican and a liberal supply of dried fruits and vegetables, with the usual navy rations; a well-chosen library, furnished partly by Government and partly by Mr. Grinnell; a moderate wardrobe of woollens; and a number of articles for barter. At St. Johns, Newfoundland, he made his purchase of fresh beef, to be marled and hung in the rigging, and received from Governor Hamilton a noble team of Newfoundland dogs. July 1, he entered the harbor of Fiskernaes, too.

late in the season to obtain the fresh stores needed for the Expedition, but securing here the services of Hans Christian (or Hendrik), then



HARBOR OF ST. JOHN'S, NEWFOUNDLAND.

a boy of nineteen, expert with the kayak and javelin. He proved so useful an assistant as to lead to his future engagements by Hayes, Hall, and Captain Nares, of the English Expedition of 1875. Reaching Melville Bay on the 27th, Kane found the shore ices so decayed, that

he did not deem it advisable to attempt the usual passage along the fast floes of the land, but stood directly to the Northward and Eastward, until he met the middle pack. Here he headed nearly direct for Cape York. July 29, fearing a besetment, he decided to fasten to an iceberg, and after eight hours' warping, heaving, and planting ice-anchors, succeeded in effecting it; but he had hardly a breathing-spell before he was startled by a set of loud crackling sounds above, while small fragments of ice not larger than a walnut began to dot the water, like the first drops of a summer shower. The indications were too plain; he had barely time to cast off before the face of the berg fell in ruins, crashing like artillery. On the 31st, when anchored to a second berg, the continued ice pressure began to affect it, and it took up its march to the south. The brig was secured to a much larger one, the course of which was steadily northward, the loose ice drifting by on each side, leaving a wake of black water for a mile behind the ship. At 10 P.M., being in immediate danger, she again got off in a lead to the northeast, pushing over in spite of the drifting trash. "The midnight sun came out over the northern crest of the great berg, kindling variously-colored fires on every part of its surface, and making the ice around one great resplendency of gemwork, blazing carbuncles, and rubies, and molten gold." Through all this jewelry the brig went crunching, and, after a tortuous progress of five miles, arrested here and there by tongues which required the saw and the ice-chisels, fitted herself neatly in between two floes. He succeeded in crossing the bay in ten days.

August 7, the "Advance" reached the headland of Sir Thomas Smith's Sound, and passed beyond the highest point gained by Captain Inglefield, R.N. Still too far to the South to carry on his proposed search, Kane now attempted the penetration of a drifting pack which met him, selecting first a provision depot, and depositing in it some supplies and his life-boat. On the western cape of Littleton Island he built his first cairn, wedging a staff into the rock crevices, on which he spread the American flag, and placing also near by a beacon, official despatches, and private letters of farewell.

Entering the pack, the "Advance" found the ice hugging the American shore, and extending across the channel. Debarred from the

Northern passage on that side, after a temporary asylum in a land-locked bay, which he named Refuge Harbor, fearing lest the rapidly advancing cold might prevent further penetrating, Kane warped out and again made fast to an iceberg. Here the drifting pack outside was at first utterly impenetrable; many bergs were driving backward and forward with the tides, and, pressing on the ice of the floes, had raised up hills from sixty to seventy feet high. Having no alternative but either to advance or discontinue the search, relying upon the strength of his ship, and the spirit and fidelity of his comrades, he determined if possible to press through the small interspace between the main pack and the coast,—an effort attended with a series of the severest experiences. Whenever the receding tides left deficient soundings, the ship was on her beam ends; twice it was impossible to secure the stoves so as to prevent her from taking fire. August 29, when she reached latitude $78^{\circ} 43'$, she had lost part of her starboard bulwarks, a quarter boat, her jib-boom, best bower anchor, and six hundred fathoms of hawser, but was herself in all essentials uninjured.

Winter was now rapidly advancing, the rapid formation of young ice making it plain that it would soon cement itself. Kane's officers united in a written opinion in favor of returning to a more Southern harbor. But he was unwilling to lose a dearly purchased progress, and be removed from the intended observations. He immediately set out to seek a spot which might be eligible for a starting-point for future travel. The party at first carried a whale-boat and sledge, but were compelled to abandon both. They advanced on foot to a point which the meridian observations of the theodolite placed in latitude $78^{\circ} 52'$, longitude $78^{\circ} 41'$ West, where the coast of Greenland was found facing plainly to the North. No spot, however, seemed to combine so many of the requisites for a Winter Harbor as that in which the ship had been left, and on the return of the party she was warped in between the islands, in a spot "secured against the moving ice, walled in to seaward, with an anchorage of a moderate depth of water, open to the meridian sunlight, and guarded from winds, eddies, and drifts,"—but to remain near this point, as will hereafter be seen, fixed in the same ice, until the unknown date at which, after being abandoned by Dr. Kane,

she was destroyed. No vestige of her could be seen on the visit to Renssalaer Harbor by Dr. Hayes, December, 1860.

September 8, Dr. Hayes, Mr. Wilson, and Hans were sent inland, chiefly to determine how far a supply of game might be hoped for. This party, on the fourth day of a laborious travel, descended into a deep, broad valley, the bed of a river then nearly dry. They spent the night in their buffalo-skins on the rocks. Carrying each on his shoulders a weight of about thirty pounds, in continuance of their journey they clambered at first over rocks from which the snow had disappeared, but soon entered on a more enlivening prospect of beds of green moss and turf. Patches of andromeda gave them here and there a carpet, and furnished fuel for their cooking. No evidences of life, however, were seen except some small herds of reindeer, a solitary rabbit, and the footmarks of a fox. At the end of a journey of ninety miles their progress was arrested by a glacier four hundred feet high, extending to the North and West as far as the eye could reach. It was midnight when they approached it, but the sun was a few degrees only beneath the horizon; stars of the second magnitude were dimly visible in the North; and a brilliant meteor, falling just in advance of the travellers, greatly heightened the effect by its reflected light on this wall of pure whiteness. Along the base of the glacier was a snowbank fifty to sixty feet in height, rising at an angle of thirty degrees; this was ascended, but the smooth ice-surface baffled all attempts to reach the summit of the glacier, which rose to an elevation of one hundred and sixty feet, rounding gradually off as it approached the *Mer de Glace* above. With all his dexterity Hans failed to secure any game.

Dr. Kane's next step was to organize parties for establishing provision depôts to facilitate researches in the Spring. The signs of intense cold were hastening; by September 10 the thermometer had fallen to 14° , the floes around the brig were cemented, and an iceberg had been frozen in, to be the companion of the party during their whole stay; the birds, even the sea-swallows, had all gone South.

The provisions brought out had not included hermetically sealed meats, and there seemed little ground of expecting game; the salted

provisions were therefore put under a process of freshening by alternate soaking and freezing under the ice-crust of a fresh-water pond.

The sled for the first depôt party, which was under McGary and Bonsall, was modelled from one received from the British Admiralty, and measured thirteen feet by four. It readily carried fourteen hundred pounds. The cargo, exclusive of supplies for the journey, was chiefly pemmican, put up in wooden cases and tinned iron cylinders, strongly protected from the assaults of the bear. Upon the cargo was a light india-rubber boat, which Kane hoped could be launched on reaching open water. The seven men attached to the sled had each his own "Rue-ra-ddy," or shoulder-belt, and his track-rope, varying in length, to prevent his interference with another when walking abreast. Leaving the brig September 20, they reached their highest latitude, $79^{\circ} 50'$, making three important caches; the third contained eight hundred pounds of pemmican. After they had been out twenty days, Kane pushed out to look for them; and after a venturesome run across the ice-belt, where his dogs once failed to leap a chasm, he met them on their return, safe though nearly exhausted.

Meanwhile, on one of the islets in Rensselaer Harbor, an Astronomical Observatory had been raised of four walls of granite blocks, cemented with moss and water and the never-failing aid of frost. They bore a substantial wooden roof. The pedestals were a conglomerate of gravel and ice; the transit and theodolite were thus free from vibration. A small magnetic observatory adjoined, in which Kane had his magnetometer and dip instrument; and on the open ice-field was the wooden Meteorological Observatory, latticed and pierced with auger-holes to allow the air to pass freely, its inner chamber, being guarded against the drift by a series of screens. The thermometers, of which there was a good supply, were of such sensibility that, when standing at -40° or -50° , the mere approach of the observer caused a perceptible rise. One of them, a three-feet spirit standard by Tagliabue, graduated to -70° , was of sufficiently extended register to be read by rapid inspection to tenths of a degree. "The influence of the winds I did not wish absolutely to neutralize; but I endeavored to make the exposure to them so uniform as to give a relative result

for every quarter of the compass." A tide register was on board the brig.

The value of the work performed under circumstances of such intense cold and suffering was appreciated, after the return of the expedition, by the Smithsonian Institution, the "Catalogue and Index" of whose publications, issued in 1882, gives, on page 33, "Physical Observations in the Arctic Seas, by Elisha Kent Kane. Made during the Second Grinnell Expedition in search of Sir John Franklin, in 1853, 1854, and 1855, at Van Rensselaer Harbor and other points on the West Coast of Greenland. Reduced and discussed by Chas. A. Schott. Part I. — Magnetism. II. — Meteorology. III. — Astronomy. IV. — Tides (Nos. 97^x, 104^{xl}, 129^{xlii}, 130^{xliii}), 1859–60. 4to, pp. 340, 17 woodcuts, 1 map, 6 plates."

The Nos. 97, etc., within the parentheses are those of the separate publications which make up this volume. Appendixes in the second of Kane's volumes of this later expedition, contain the preliminary notes from which this Publication has been made. Appendix XVIII. is Mr. Durand's examination of plants collected on both expeditions — on the second with the assistance of Dr. Hayes.

The latitude and longitude of the Astronomical Observatory are given. "Lat. 78° 37' N., Long. 70° 40' W. The island on which the observatory was placed was some fifty paces long by perhaps forty broad. The highest point of the island was about thirty feet above the mean tide-level of the harbor."

November 7th, darkness came on with insidious steadiness; the thermometer at noonday only could be read without a light; the black masses of the hills, with their glaring patches of snow, were still visible. The stars of the sixth magnitude shone out at noonday; the moon, now at her greatest northern declination, swept round the heavens, at the lowest part of her curve 14° above the horizon. In the brig, a mean temperature was kept at 65° below deck; above, under the housing, it was as high as the freezing point. Winter was fully upon them.

The party began to realize their situation. They found it difficult to keep up a cheery tone. Even Hans was sorely homesick "until his

nostalgia was treated first by a dose of salts, and secondly by promotion." He had bundled up his clothes and threatened a good-bye, "but soon became as happy as a fat man ought to be."

The brig was now made as comfortable as possible; the deck housed in and corked with oakum, and within a system of warmth and ventilation secured. The arrangements for cooking, ice-melting, and washing were minutely cared for.

The usual daily Arctic routine was established. At 6 A. M. the decks were cleaned, the ice-hole opened, the ice-tables measured, and things aboard put to rights. At half past seven all hands washed on deck and came below for breakfast, which was alike for all,—hard-tack, pork, stewed apples frozen like molasses candy, tea and coffee, with a delicate portion of raw potato. After breakfast, smoking till nine; and then each to his occupation until dinner, when the raw potato came in again for hygiene. This last morsel was anything but palatable, although its good effects on gums threatened with scurvy were often pointed out. Six o'clock brought supper, with little variation of the diet named, and then the amusements of cards, chess, and the Magazine cheered the evening.

The small force of the company had been reduced by sickness, and the deck officers and effective men had enough of ship's duty to occupy several hours of each day. Mr. Sontag was assisted at the observatory alternately by the Commander, Mr. Bonsall, and Dr. Hayes; on board he had his charts and computations. When the season had fully set in, the last-named officer had a hospital on hand, and specimens in natural history to prepare, with the meteorological tables, the log-book, and other official records to occupy him. There was no idling on board during the one hundred and twenty days of the sun's absence.

The long and dreary winter was exceptionally severe,—the thermometer registering, January 17, —49°, and February 5, —68°. The reduced mean of the best spirit standards gave —67°; chloric ether and the oil of winter-green became solid. The influence of the long and intense darkness was most depressing, and of the ship's company scarcely one was exempt from scurvy. More than fifty dogs died from an anomalous form of disease to which the absence of light contributed

as much as the extreme cold. They ate voraciously, kept their strength, and slept well, but barked frantically at nothing, and walked in straight and curved lines with anxious and unwearying perseverance; generally they perished with symptoms resembling lock-jaw, in thirty-six hours after the first attack. Their loss interfered seriously with the original plan of search; it had been contemplated to employ them in following the coast, but now a new system must be established, new sledges built, and equipments provided suited to larger parties and of a more portable character.

At the opening of spring the party was too small for an extended system of operations; the only hope of continuing the search was to be found in a passage through or over the ice-fields to the north. March 17, Kane was anxiously waiting to send out his first advance party. The thermometer outside stood at -46° , but from the deck of the "Advance" he saw the promise of milder weather. To the northward all the bright glare of sunset streamed out in long bands of orange through the vapors of the ice-foot, and the frost-smoke exhaled in wreaths like those which one sees curling from the house-chimneys as he comes down a mountain side into a valley. On the third day following, the *dépôt* party started out. But the heavy gale from the north-northeast overtook them, their thermometer fell to -57° , and when found by a rescue party under Kane they were at the point of entire exhaustion, having been without sleep eighty-one out of eighty-four hours. Two of the men, Baker and Schubert, died not long after their return to the brig; all save one suffered with temporarily impaired minds.

As soon as the health of his company justified it, Kane renewed his attempts by three expeditions: in April and May under his own guidance, in June under Dr. Hayes, and in June-July under Morton, accompanied by Hans.

The first of these explorations was along the base of the great glacier issuing from the coast of Greenland in Lat. 79° ,—a glacier revisited and surveyed the year following. But the scurvy painfully reappeared, the snow deepened till the men sank to their middle, the dogs were so buried that the sleds were unloaded and their cargoes carried, and the supplies expected to be found available in the cache of the previous

fall were found destroyed by the bear. Three of the party were overcome by snow-blindness, and Kane himself was carried back to the brig, where he lay ill with scurvy and typhoid fever, unable to walk until June 9.

The location of the entire northern coast line was still a blank; the theodolite had made for them the discovery that it trended eastward. Dr. Hayes renewed an attempt for its exploration. Leaving the brig, May 20, he pressed on, in company with William Godfrey, on a due north line, but, encountering the squeezed ices, soon worked to the eastward, following an extremely tortuous course of not more than ninety miles in a direct line, but of actual travel two hundred and seventy. The whole travel of twelve days was one of not less than four hundred miles. The new coast line added by this journey to the chart was about two hundred miles in extent. His return from the highest point reached, latitude $79^{\circ} 45'$, became a necessity by the giving out of the pemmican and by severe snow-blindness and exhaustion.

Morton's journey, which followed, was a new era in the expedition. June 15 he reached the base of the great glacier, after travelling due north over a solid area choked with bergs and frozen fields, and on the sixth day after, made for what he thought a cape, seeing a vacancy between it and the west land. On his reaching the opening he found it a channel, its mouth covered with ice. After turning the cape he met with a good, smooth ice-foot in the entering curve of a bay, where the land soon grew lower,—a long, low country with rolling hills opening to the view. The open water was black with dove-kies, the tern were numerous, and flying high over head were large, white birds; mollemokes were feeding on the water, and then flying over it well out to sea. Never had the birds been seen so numerous. A flock of brent geese made a curve out to seaward, and then flew far ahead over the plain, showing that their destination was inland.

Morton walked over the hummocked ice on the shallow bay, and saw another opening, not quite eight miles across, separating two islands; the open passages were fifteen miles or more in width. He tried in vain to pass entirely round this cape, nor could he ascend the very high cliffs more than a few hundred feet. But at that height he

fastened to his walking-pole the flag which had accompanied Commodore Wilkes on the Antarctic Expedition of 1838-42, and DeHaven in the first Grinnell Expedition. Looking out upon the great waste of waters before him, "not a speck of ice could be seen." From a height of 480 feet, which commanded a horizon of almost forty miles, his ears were gladdened with the novel music of dashing waves; and a surf breaking in among the rocks at his feet stayed his further progress. This cheering news confirmed at the time all the arguments which Kane had revolved in the past, in favor of an open Polar Sea. It was, however, the last achievement which the Expedition could secure. For the season of Arctic travel had now ended, and the summer was wearing on, but the ice did not break up, as was expected; anxious thoughts for the coming year were inevitable. It seemed as if a second winter must overtake the ship before she could get half-way through the pack, even if warping to the South should begin at the earliest moment possible. Yet the party were confessedly ill-fitted for another Arctic season, having neither health, fuel, nor provisions. On the other hand, to abandon the vessel seemed to be inexpedient if not impracticable, as it would involve the necessity of carrying sick and newly amputated men,—one-half of the company being disabled. Kane thought he could not desert the brig while there was a chance of saving her.

An exploring journey of sixty miles confirmed his belief that he could not escape in open boats, and he determined to make an effort to communicate with Beechey Island, and the English squadron there under Sir Edward Belcher. Setting out on the 12th of July, with five volunteers, he found the pack solid from Jones' to Murchison's Sounds, and the ice still investing the American shore some twenty miles from Cape Isabella. After several attempts to bore, and an approach within ten miles to Cape Parry, the chances of further success utterly failed. No course was left but to return to the brig, and look forward to a second winter. In Kane's journal, August 18, he writes: "It is *horrible*—yes, that is the word—to look forward to another year of disease and darkness to be met without fresh food and without fuel. I should meet it with a more tempered sadness if I had no comrades to think

for and protect." He determined to place on Observatory Island a large signal beacon or cairn, burying under it documents which, in case of disaster to the party, would convey intelligence of their proceedings and fate. The beacon was erected on a cliff, upon a broad face of rock looking out upon the icy desert. On it were painted, in large letters, the words, —

ADVANCE.

A. D. 1853-54.

A pyramid above this was marked with a cross; underneath were placed the coffins of the two dead seamen. Near by, in a hole in the rock, a paper, enclosed in glass, sealed in with melted lead, gave the names of the survivors, and the results of the explorations which had been made. The party then prepared themselves for the possibility of entire destruction.

Yet some of them, including Petersen, who had been out in the searching expedition with Captain Penny, now believed that an escape to the South was still practicable, and that the safety of all would be promoted by withdrawal from the brig. To detach any, Kane thought neither right in itself, nor practically safe; personally, it was a "simple duty of honor to remain by the brig" till he had proved the effect of the later tides; and after that it would be too late. But, come what might, he would share her fortunes. Yet, while he would not detach any, he did not think he had the moral right to detain any through a second winter. He made a final inspection of the ice, again determined escape to be impossible, and then, calling all hands and explaining to them fully their true condition, strenuously advised that they should forego the project of returning South, but added that he would freely give permission to any who were desirous to make the attempt. At the call of the roll each man answered for himself, and eight out of the seventeen survivors resolved to stand by the brig. On the 28th, liberally supplied with their portion of the resources, the eight others moved off with elastic step, under the leadership of Dr. Hayes, leaving the little number left behind to the pressure of the thoughts of the waning efficiency of

all, the impending cold, dark night of winter, their poverty of resources, and the dreary sense of complete isolation.

Dr. Hayes, in his "Arctic Boat Journey," published in 1871, presents the following account of their separation, with his reasons for leaving the brig: "The ice in the centre of the channel had broken up, and had drifted down into Force Bay. Escape for the brig was hopeless. She could not be liberated. Either of two courses was now open to us,—to remain by the brig and try in her the chances of a second winter, or to seek safety in our boats to the South."

"That everything possible had been done towards the attainment of the objects of the cruise, was not doubted by any officer or man of the brig's company; and certainly the character of the commander might itself have been relied upon by them as a sufficient guarantee of the hopelessness of future efforts when he had renounced them as fruitless. The question was simply when we should set out homeward—whether we should pass the winter in the vessel and start for Upernavik in the Spring, or make the attempt without further delay. In either case we must abandon all thought, either of further exploration, or of preserving the brig. The recent observations of Dr. Kane had been such as to prevent his detaching even an experimental party to the South, so great did the perils of a journey in that direction appear to him. On the other hand, so urgent were our necessities, and so difficult of solution the problems upon which depended the safety of the persons under him, that, although his natural bias as commander inclined him to stay by the vessel at whatever cost, yet he rightly considered it unjust, now that the cruise was in effect ended, to interpose the weight of his official authority to determine the choice of time for our setting out. . . .

"In addition to the motives which influenced the resolution of others, there were some which had peculiar relation to myself as medical officer of the brig. To remain in her during the coming winter, and thus keep together so large a number of persons as the entire company, in quarters so straitened, subjected to the worst causes of disease, without the most essential means either of prevention or cure, would, I felt assured, convert the brig into a mere hospital, where the most depressing influences must be engendered. Originally prepared for only a

single winter, we had now completely exhausted our fuel, except seven hundred and fifty tons of coal, after the consumption of which we must break up the ship; and our remaining provisions, although ample in quantity for the entire company through the winter, consisted mainly of salted meat, which, from its effect in producing and aggravating scurvy, as shown by the last winter's sad experience, threatened to be fatal to men in our condition. If one-half the company should leave the vessel to try the southward journey there would be a sufficient number of men in each party to form a complete organization. Those remaining with the vessel would have the professional skill of Dr. Kane, with augmented means of health and comfort; and the cause of disease would be proportionally diminished. If the travelling party should perish by the way, the deaths would probably not be more numerous than if all should continue together; and whatever the fate of that party, the persons at the brig would be in improved condition in the Spring.

"It was remembered by all of us that to make a Southward Journey in boats to Upernavik, rather than to hazard a second winter in the ice, had previously been repeatedly discussed, as among the alternatives which awaited us; and it was a subject long familiar to all of us. If, after the completion of the Spring work, the season should be backward, it had been regarded as one of our recognized means of safety, to transport boats and provisions over the ice to open water, and early in September to push southward. This was one of the considerations which originally influenced Dr. Kane in favor of wintering in Rensselaer Bay.

"The failure of his late expedition to Beechey Island, and the prospect of an early winter (for the young ice was making rapidly), led him to the conclusion which he announced to his officers, namely, that the pack in the North Water which had baffled him would still remain, and would interpose an insurmountable barrier to any attempt to escape to the South. This, however, he submitted to our judgments as a question upon which each of us was now called to think for himself.

"On the other hand, it was believed by Mr. Petersen, whose long experience of the movements of Arctic ice entitled his opinion to

great respect, that this North Water 'pack' had never previously been observed; that it was merely accidental; and that such was the rapidity of ice movements, we had every reason to believe that it would entirely disappear within two weeks. Again: if a party should succeed in the attempt to reach Upernavik (the distance to which was not greater than that to Beechey Island), they would there pass the winter, and being directly in the line of the Baffin Bay whalers, (which go annually within from one hundred to one hundred and fifty miles of Smith Strait), they could give information of the condition of the 'Advance,' and by means of either one of those whalers, or of one of the small sloops known to be at the Danish settlements, communication could be opened to Rensselaer Harbor."

The narrowed companionship of the company remaining on the brig seems to have aroused all their remaining energies in providing for their daily necessities, with the cherished hope of better things still in store. The months of September, October, and November were filled with the occupations of taking care of the ship, and securing for food the bear and the walrus; the numerous Arctic hares fed the few dogs which were left. Kane himself found the rats as an article of diet less inviting, but also less hurtful to health than the liver of the bear. They were too numerous to permit anything to be stowed below decks, destroying even the men's bedding in the forecabin.

At one time in this dark period Morton and Hans tracked the Eskimos to Etah, bringing back two hundred and seventy pounds of walrus-meat and a couple of foxes. A party from that settlement had previously made a visit to the brig, committing a number of acts of theft; but the stolen goods had been recovered, the thieves punished, and a treaty binding the Innuits that they would not henceforth steal, would bring fresh meat, sell or lend their dogs, and show where game could be found, was now ratified by the Kab-lu-nahs, with the promise that they would not visit the Eskimos with any hurt or mischief, would make them welcome aboard ship, trade with them, and make them presents.

December 8, Bonsall and Petersen, two of those who had left the

brig more than three months before, were brought back on the sledge of the Eskimos, and on the 12th Dr. Hayes also came in. Riley had returned five days after leaving. Dr. Hayes' party had journeyed three hundred and fifty miles, with the thermometer at -50° , living for more than two months on frozen seal and walrus-meat. The Eskimos who accompanied them on the return had been engaged from different settlements on the way, except the volunteers who added themselves as they neared the brig, till they numbered six drivers and forty-two dogs. The whole party of natives took a sound sleep and a continuous feed on the "Advance," and passed off through the hummocks in good spirits, stealthily carrying some knives and forks.

Within a very few days after leaving the brig the courage of some of those under Dr. Hayes had steadily waned, a second man having started to return, and a third coming very near to a like decision. The remaining eight persons attempted to continue their Southward journey in two boats; but before reaching Littleton Island every lead was more than once closed, and the boats and cargo dragged over the ice. By September 6 seventy-five miles had been made in eleven days, and Baffin's Bay opened before them with the delusive promise of a more comfortable journey. Giving three lusty cheers for Upernavik, the whale-boat and the "Forlorn," now called the "Good Hope," stood away for Cape Alexander, fourteen miles distant. Passing this in a dead calm, after a tempestuous time, on the 8th of September they were on their way to Northumberland Island, but with a pack around them on every side at the mouth of Whale Sound, the ice being more firm and secure than it had been expected to be found even in Melville Bay. Camping next on the shore of Booth Bay, the little party were visited by some Eskimos from Netlik, and they were compelled to take up their abode at first with them, and afterward within reach of them, until their return to the "Advance."

The whole story of their absence has been summed up in the statement that they were frozen up at a distance of three hundred miles from the vessel, and, building at Booth Bay, thirteen miles below Cape Parry, an Eskimo hut in the crevice of a rock, for three months they lived almost without fire or light, subsisting upon such small supplies

of walrus meat as they could procure from natives living fifty miles distant. At times this precarious supply utterly failed them. Being situated upon the most barren part of this inhospitable coast, they were always unfortunate in their hunting excursions, and at one time for three weeks had nothing to eat but stone moss, scooped from the snow-covered rocks. Fortunately they were spared the horrid alternative of eating each other by the timely appearance of the Eskimos, but at last were driven by starvation to move back toward their vessel, by the aid of the Eskimo dogs and sledges, making the long journey by *moonlight*, with the thermometer never less than 70° , and often 85° below freezing. Reaching Cape Alexander, the entering Cape of Smith's Strait, they found an open crack in the ice five miles in width, while numerous smaller cracks broke up the ice two miles to the south of it; and here, pushing forward at the head of the party, Dr. Hayes attempted to leap one of these cracks, but alighting upon a piece of ice which he supposed to be solid, was precipitated into the water, and though rescued by his companions, was, in spite of his bear and seal-skin clothing, wet to the skin. Reaching the open water, he found the only chance to pass the Cape was on the ice-foot (a mass of ice glued up against the rocks) in places not three feet in width. This the Eskimos, accustomed as they were to all sorts of peril, refused to do until intimidated by Dr. Hayes's pistols. They crawled slowly round this shelf of ice, clinging to the crevices of the rocks with their naked hands, the water twenty feet vertically below them lashing the icy shore, the thermometer 50° below zero, the blasts of wind raging like the voices of demons through vast caverns in the rocky wall that towered above them, whirling down sheets of crisped snow upon their heads; and, to complete the horror of the scene, the moon having set behind the mountains, the water was black as Erebus in the gloomy shadows, except when broken by a phosphorescent wave. They had to run fifteen miles after passing the Cape to reach the nearest Eskimo station, and Dr. Hayes was only kept alive by his driver pounding him with his whip-stock. As it was, his body was badly frozen in many places. On the brig he was immediately cared for in the kindest manner. Kane gave up to him his own bunk.

The arguments which have been cited had, doubtless, seemed at the time not only to justify the departure of this party, but to require it for the good of all, and an impartial review of their whole condition seems to compel the judgment that the Commander of the "Advance," though exhibiting at all times a most conscientious desire for the performance of duty to each one intrusted to his care, erred in not taking upon himself the responsibility of a return before the close of the summer of 1854. The consciousness of an inability to secure provision for a second Arctic winter, and the diseased condition of the ship's party, might have been much weightier arguments for determining his course than was the merest possibility of saving the brig, or even the more tempting inducements of making further discoveries. Certainly, that which in the outset he had set before him as the prime object of the expedition — the rescue of Franklin — had been taken out of his control; and it was unfortunately true that he had no second vessel on which in an emergency to fall back for supplies, those of the original outfit too having been, as will be remembered, very scanty. The history of this expedition strikingly confirms the judgment of Secretary Preston in his instructions to the *two* ships of the first expedition to avoid, if possible, a second winter in the ice. On the other hand, the sufferings and forced return to the ship by the party under Dr. Hayes would seem to strengthen Kane's judgment, that if all the rest had accompanied him they could not have reached Upernavik before the winter of 1855.

As the year closed, Kane made one more necessary sled journey in the hope of collecting walrus beef, chiefly for McGary and Brooks, who seemed rapidly sinking. The only diet for the trip was some meat biscuit, with a few rats chopped up and frozen into tallow balls. The dogs were fed on their dead brothers, one of them dying in the very act of eating; six of the eight soon became useless. Both Kane and Petersen were near losing their lives in a hut of refuge, and as a forced necessity to save the dogs and themselves, they returned to the brig on foot, driving the dogs before them. Their walk of forty-four miles in sixteen hours, "almost scudding before the gale," closed their year 1854.

The events which filled the remaining time of the expedition, the

rest of the Winter and the Spring and Summer months until the relief of the party by Captain Hartstene, September 11, 1855, were of the most sombre character; the few reliefs in the dark picture being the opportunity of a second visit to the great northern glacier, now closely observed by Kane; the preservation of life under the most unpromising conditions; the heroic fortitude shown by the men under Kane's leading example; and their final rescue.

January 14, 1855, Kane wrote: "Our sick are about the same. How grateful I ought to be that I, the weakling of a year ago, am well, and a helping man. But the present state of things cannot last. The sick require meat, and we have but three days' allowance — thin chips of raw walrus, not exceeding four ounces in weight for each man per diem." He set out to get help from the lower Eskimo settlement, but again the dogs failed him, one of the four falling into frightful convulsions. Hans, adventurous and buoyant as he usually was, cried like a child, and Kane, sick and worn-out, found his own equanimity at fault. A renewed attempt under Petersen met with a like failure.

A RELIEF SHIP PROVIDED.

At the homes of the explorers in the United States, when the second Winter set in without bringing home the "Advance" and her crew, the most serious alarm for their fate had been felt by their friends. The ordinary apprehension of danger in Arctic service was increased by the experience of the Winter which had passed, and the deficiencies of the outfit for a second season in the ice were remembered. Congress was memorialized by the societies which had encouraged the undertaking, and the general sentiment of the people pressed upon their Representatives for a Relief Expedition in the coming Spring. A Joint Resolution of Congress, approved February 3, 1855, authorized the Secretary of the Navy "to provide and despatch a suitable naval or other steamer, and, if necessary, a tender, to the Arctic Seas for the rescue or relief of Passed Assistant Surgeon E. K. Kane, U.S.N., and the officers and men under his command." This was followed, March 3, by an appropriation of one hundred and fifty thousand dollars for the object named in the Resolution. The bark "Release," of Boston, and



AN ARCTIC MOONLIGHT SCENE.

Witnessed by the "Polaris."

the propeller "Arctic," of Philadelphia, were procured, and especially fitted and equipped for the service under the supervision of Lieutenant Henry J. Hartstene, to whom the command of the expedition was assigned. Full rations and extra provisions for two years, with clothing adapted to an Arctic climate, were provided, and officers and men selected by the Commander were detailed by the Department.

The Secretary was not acting prematurely, for the same month of March had found Kane's party in no improved condition — every man on board being tainted with scurvy, and the last remnant of fresh meat doled out. It was not until the 15th that a fresh supply was received through another visit by Hans to Etah; it was renewed by a journey by Kane himself to this most northern Winter settlement of the Eskimos, about seventy miles from the brig. At that time the natives had just began to hunt with avidity, after famine and disease had reduced them to the lowest state of misery and emaciation.

The sun had come back, February 21, from a disappearance of one hundred and forty days below the rocky shadowing of the brig; Dr. Hayes, through sickness, had not seen him for five months and two weeks.

With the close of April Kane made his last effort to explore the further shores beyond Kennedy Channel. He had but four dogs left out of sixty-two, and his Eskimo friends had been obliged by famine to kill nearly all their own stock; but Kane succeeded in securing their assistance with three sleds, and pressed up high enough to survey the great glacier so graphically described in his second volume, but could not prevail on the Eskimos to make a further northward advance.

When May came, everything admonished the party that the time was at hand when they must leave the brig, and trust the floes. Preparations for this had been making for some time past, and the crew with the returning season had now gained sufficient health to complete them. On the 20th the whole ship's company brought to Kane an engagement reciting that they fervently concurred with the

Commander in his attempt to reach the South by boats; and that they had determined to abide faithfully by the expedition and the sick, and advance the objects in view. Their last visit was now made to the brig, the flags were hoisted and then hauled down, and a statement affixed to a stanchion near the gangway, showing the necessity for abandoning the ship, to remain longer upon which could in no manner advance the search for Franklin, but only prove destructive to men who had already suffered from the severe climate and disease. Her upper spars, bulwarks, deck sheathing, bulkheads, and other parts had already been consumed for fuel. She lay upon ice nine feet in thickness. The party had two whale-boats, each twenty-four feet in length, and a light cedar dingy of thirteen feet; these were mounted on runners eighteen feet long, shod with hoop-iron, and lashed together so as to form a pliable sledge. The sick and the reserve of provisions were transported on a sledge by a team of dogs, Kane himself performing this office. The month closed with these occupations.

On the very last day, May, 1855, "by a coincidence which cost some effort to bring it about," precisely two years after the sailing of the party from New York, Lieutenant Hartstene's Relief Expedition of forty officers and men sailed from the Brooklyn Navy Yard, pressing northward for the relief, while the disabled party were forcing their suffering way South.

By the middle of June all of Kane's disabled men, and some twelve hundred pounds of stores, had been transported, by journeys of in all 1,100 miles, to Annatoah, their first sick station. The U. S. Coast survey theodolite, the apparatus furnished by the American Philosophical Society, and the valuable library were left behind; the documents of the Expedition were carried forward. June 12, when the boats and sledges had come to a halt in the narrow passage between the islands opposite Cape Misery, a message from Dr. Hayes reached Kane in the "Advance" boat, informing him that Christien Ohlsen had died. The body of this tried and courageous man, sewed up in his own blankets, was carried in procession to the head of a little gorge on the east face of Pekiutlik, and by hard labor consigned to a

sort of trench, and covered with rocks for protection from the fox and the bear. A small tablet of lead, on which were inscribed —

CHRISTIEN OHLSEN.

Aged 36 years,

was laid on his breast. The Cape of Littleton Islands that looks down on him bears his name.

The Eskimos of Etah faithfully assisted the party throughout the whole of this heavy transport over the ice up to the margin of the floe, on reaching which the boats were transported over eighty-one miles of unbroken ice; the party had walked three hundred and sixteen miles in thirty-one days. From that point the next ten miles was run in one day under sail, when they were again forced to make alternate movements over ice and water. They had perpetual daylight, but halted regularly at bedtime and for meals. On the lower part of the journey toward Cape York, which they reached on the 21st of July, they found the birds in abundance, and they succeeded in drying on the rocks for the transit of Melville Bay two thousand pounds of the Lumme. After building at the Cape a beacon cairn, and depositing the records of the Expedition, the crossing of Melville Bay was effected with renewed suffering, the party being consolidated into two boats; — the third was needed for fuel. August 6, on the eighty-third day after leaving the "Advance," they arrived at Upernavik, and were welcomed with characteristic hospitality. Passage was immediately taken in the Danish brig "Mariane," its Commander engaging to land them at the Shetland Islands; but touching a few days at Godhavn on the 11th, when they were on the eve of setting out for Europe, the lookout man at the hill-top announced a steamer, and when it drew near, the Stars and Stripes were recognized, the boat "Faith" was lowered, with the little flag that had visited both hemispheres opened to the breeze; and as Kane's party came alongside of the "Release," "Captain Hartstene hailed a little man in a ragged flannel shirt, 'Is that Dr. Kane?' and with the 'Yes,' that followed, the rigging was manned and cheers welcomed them back to the social world of love."

October 11, 1855, Capt. Hartstene reported to the Secretary of



GODHAVN, GREENLAND, VISITED BY HALL, AUG. 6, 1871.

the Navy, from New York, the arrival of the fifteen survivors of the Expedition on board the two Relief vessels; stating in his brief letter that they had been received on board at Lievely, after making their way down the coast in boats and sledges by unprecedented energy and determination. The "Release" and the "Arctic" had both proved themselves all that could be desired, particularly the "Arctic," which had, in addition to her steam motive-power, the qualities of a good, weatherly, moderate-sailing vessel. They had been severely nipped and chafed by the ice, but were generally in good condition.

The Commanding Officer had sailed "*untrammelled by any stringent instructions*" from Secretary Dobbin.* He had experienced a boisterous outward passage of twenty-seven days to Disco, with indications there of such a state of the icy region before them that "in order to avoid further risk of human life in a search so exceedingly hazardous," he had there suggested to the Department, "the impropriety of making any efforts to relieve them if they should not return, — he felt confident of the ability of his officers to accomplish their own release."

On the passage to Upernavik he had met with two Scotch whalers from Aberdeen, latitude $69^{\circ} 39'$, longitude $63^{\circ} 30'$, and at once hoped for news of Dr. Kane's party from them, but was disappointed. He had the opportunity of putting on board a despatch for the Department, with letters. The whalers said that Melville Bay was so packed with

* NAVAL RECORD OF THE OFFICERS OF THE RELIEF SHIPS. — Henry J. Hartstene entered the Naval Service as Midshipman April 1, 1828; promoted to be Lieutenant, February 23, 1840; to be Commander, September 14, 1855; died, 1872. Charles C. Simms, commanding the "Arctic," entered the service as Midshipman, October 9, 1839; promoted to be Passed Midshipman, July 15, 1845; to be a Master, January 15, 1854; to be Lieutenant, August 12, 1854. Acting Master W. S. Lovell entered the service November 8, 1847; promoted to be Passed Midshipman, June, 1853; to be a Master, September 15, 1855; to be a Lieutenant, September 16, 1855; resigned, May 3, 1859. Watson Smith, Acting Master, entered the service October 19, 1841; promoted to be Passed Midshipman, August 10, 1847; to be Lieutenant, September 15, 1855. J. P. Fyffe entered the service September 9, 1847; promoted to be a Master, September 15, 1855; to be a Lieutenant, September 16, 1855; to be Lieutenant-Commander, July 16, 1862; to be a Commander, December 7, 1867; to be Captain, January 13, 1879. Harman Newell entered the service September 22, 1849; promoted to Second Assistant-Engineer, February 26, 1851; to be First Assistant, May 21, 1853.

ice that all fishing ships had turned back in despair, and that to attempt its passage would be to confront danger to no purpose. Hartstene and Simms pressed forward. After mooring to bergs for some days near Wedge Island, the ice without any apparent cause, except the remarkable mysterious currents, disappeared, leaving them to steam uninterruptedly into the closely-packed floe of Melville Bay. In twenty-eight days more they had crossed it, and were in the North Water.

In an article written for "Putnam's Magazine" for May, 1856, Dr. J. P. Kane, Acting Assistant-Surgeon of the "Advance," when describing this crossing, says: "The navigation of Melville Bay is after its own kind and no other. Sometimes the nips would squeeze us like a shellbark between a pair of nut-crackers; sometimes all hands were out on the ice, towing like horses of a canal-boat; sometimes we would make a hard mile a day by planting anchors in the ice ahead, and dragging ourselves up to them by the capstan, — all hands at work, from the captain to the ship's cook. At other times we would get up steam, and, except that we might have to butt our way through one or two projecting tongues of ice, we would have an uninterrupted run for twenty or thirty miles on a stretch. All this time Captain Hartstene kept the deck with untiring energy, conning the ships, and selecting the most favorable leads himself. His arm was in a sling, as he had received a severe injury in getting out coal in the Waigat, where, as usual with him, he was bent upon proving he could do more hard work than any two other men. At last he fell down the companion-ladder and sprained his ankle, and some of his junior officers thought that now, at least, they would have a chance to show their skill in conning. But they reckoned without their host. To the surprise of everybody he limped on deck, ordered a rope to be tied round his body, and by the aid of a couple of sailors was hoisted to the masthead, from which point he gave his orders as if nothing had happened. Perched up in a sort of tub, called the crow's-nest, with a bowl of soup sent up to him to keep body and soul together, there he staid for thirty-six hours on a stretch, with the thermometer below the freezing point, rather than risk the torture of a second hoisting."

Again disappointed by finding no traces whatever of men at Cape Alexander, or at Sutherland Island near by, Hartstene left upon it the following records, which, at the later date of August 3, 1876, Captain Allan Young, on his second voyage of the "Pandora," found in a pulpy state within a demolished cairn. They were still decipherable, and Captain Young forwarded them to the United States State Department:—

"CAPE ALEXANDER, August 16, 1855.

"The United States brig 'Arctic' departed from her consort, the 'Release,' on the morning of the 15th inst., off Wolstenholme Island, arrived here this day, and having made unsuccessful search for traces of Dr. Kane or Sir John Franklin and their associates, proceeded immediately on to Cape Hatherton for the same purpose.

"H. J. HARTSTENE,

"Lieutenant-Commanding U. S. Arctic Expedition.

"Returned here from Cape Hatherton August 18, having received information from Eskimos. Dr. Kane had lost his vessel, and gone in his boats. I am going to Beechey Island.

"HARTSTENE."

"AUGUST 19, 1855.

"I have returned from Cape Hatherton, and on my way to rejoin you. If I miss you, remain off Cape Alexander till I return.

"HARTSTENE."

"UNITED STATES BRIG 'ARCTIC,'

CAPE ALEXANDER, August 16, 1855.

"SIR,—Finding no traces of the missing ones, I shall proceed immediately to Cape Hatherton, in continuance of the search, where you will join us. . . . You will re-enter the record of our touching here, together with another from yourself to the same effect, all your records to be within seventy-two feet north by compass, on a cairn erected on the most conspicuous and accessible point. Respectfully,

"H. L. HARTSTENE,

"Lieutenant-Commanding Arctic Expedition.

"Lieut.-Com. Charles C. Simms, U. S. bark 'Release.'"

Passing further northward, he discovered the first signs of the missing party at Pelham Point. These signs, however, were few and unimportant, proving only Kane's visit at this place in 1853. Determining to push on as far north as possible, the Commander rounded this point, lat. $78^{\circ} 32'$; but was then opposed by a solid hummocky field of ice, without visible limit and interspersed with bergs, all drifting southward. He dropped with this drift under sail, examining Cape Hatherton and Littleton Island, and finally taking refuge under a projecting point fifteen miles northwest of Cape Alexander. Here he was first hailed by human voices. Conducted by two Eskimos who had come ashore, the party who landed paced along the borders of a finely sheltered bay some three miles, over an endless carpet of gay poppies and other wild flowers, which formed patterns upon the soft and pale green grass, and came upon the Eskimo settlement at Etah, — seven small summer tents covered with canvas, but black with crusted grease and dirt. The thirty inhabitants were already assembled on a green mound in front of the village to greet Hartstene, Lovell, and Dr. Kane's brother, all of them crying with one word, hullo! hullo! and then with a measured accent, "Docto Kayen! Docto Kayen!" A close examination of the most intelligent, aided by an Eskimo vocabulary, brought out the repeated declarations that the ice had crushed Kane's vessel, and he had gone south with sledges and boats. May-ouk, the Eskimo examined, swayed his body backward and forward, drew the figures of Kane's boats, squatted down, imitating the gestures and voice of a dog-driver, and agreed with all the others in the number of the party which had gone south.

The relief ships leaving Etah, stood over to Lancaster Sound with the design of reaching Beechey Island. But again the ice debarred their course, preventing the Commander from executing the commission of erecting on the island the monumental tablet sent out by Lady Franklin. Having made the whole circuit of the Northern part of Baffin's Bay, except the deep indentation between Capes Combermere and Isabella, and having fruitlessly examined Possession and Pond's Bay, Hartstene returned south to Upernavik and Disco, at the latter place receiving, as has been related, the missing explorers.

REPORTED RESULTS OF THE EXPEDITION.

In Kane's final Report to the Secretary of the Navy, he summarizes the work of this Expedition by saying: "Greenland reaches its furthest western point at Cape Alexander, in the neighborhood of latitude $78^{\circ} 10'$ N., and, after passing longitude 70° W. of Greenwich, trends nearly due east and west ($E. 20^{\circ}$ N.). This northern face of Greenland is broken by two large bays, at the base of which are numerous granitoid islands, which, as you approach lon. 65° W., assume the form of an archipelago. Fifteen islands were surveyed and located here. The aspect of the coast is imposing, abutting upon the water-line in headlands from eight hundred to fourteen hundred feet high, and one range of precipice presenting an unbroken wall of forty-five miles in length. Its geological structure is of the older red sandstones and Silurian limestones, overlying a primary basis of massive syenites. The sandstones to the south of 78° seem to form the floor of the bay. They are in series, with intercalated greenstones and other rejected plutonic rocks, and form the chief girders of the coast.

"The further progress of our parties toward the Atlantic was arrested by a great glacier, which issued in lat. $79^{\circ} 12'$ N., lon. $64^{\circ} 20'$ W., and ran directly north. This forms an insuperable barrier to exploration in this district; it is continuous with the *mer de glace* of interior Greenland, and is the largest true glacier known to exist. Its great mass adapts itself to the configuration of the basis-country, which it overlies. Its escarpment abutting upon the water presents a perpendicular face, varying from three to five hundred feet in height.

"The lines of crevasse and fracture are on an unexampled scale of interest. The bergs, which are ejected in lines, arrange themselves in a sort of escalade, which confers a character of great sublimity upon the landscape.

"It was followed along its base, and traced into a new and northern land, trending far to the west. This land I have named Washington. The large bay which separates it from the coast of Greenland and the glacier I have described bears on my chart the name of our liberal countryman, Mr. Peabody.

"The coasts of this new territory, adjoining Peabody Bay, have been accurately delineated by two parties, whose results correspond. Its southwestern cape is in lat. $80^{\circ} 20' N.$, by observation with artificial horizon; its longitude, by chronometer and bearings, $66^{\circ} 42' W.$ of Greenwich. The cape was doubled by William Morton and our Eskimos, with a team of dogs, and the land to the North traced until they reached the large indentation named Constitution Bay. The whole of this line was washed by open water, extending in an iceless channel to the opposite shores on the west. This western land I have inscribed with the name of Henry Grinnell."

"The course of this channel at its southern opening, was traced by actual survey in a long horse-shoe curve, sharply defined against the solid ice of Smith's Sound, and terminating at its extremes against two noble headlands about forty miles apart. The western coast was followed in subsequent explorations to a mural face of nine hundred feet elevation, preserving throughout its iceless character. Here a heavy surf, beating directly against the rocks, checked our future progress.

"The precipitous headland, the furthest point attained by the party, was named Cape Independence. It is in lat. $81^{\circ} 22'$, long. $65^{\circ} 35' W.$ It was only touched by William Morton, who left the dogs and made his way to it along the coast. From it the western coast was seen stretching far toward the north, with an iceless horizon, and a heavy swell rolling in with white caps. At a height of about five hundred feet above the sea this great expanse still presented all the appearance of an open and iceless sea.

"It was approached by a channel entirely free from ice, having a length of fifty-two, and a mean width of thirty-six geographical miles.

"The coast ice along the water-line of this channel has been completely destroyed by thaw and water action; while an unbroken belt of solid ice, one hundred and twenty-five miles in diameter, extended to the south. A gale from the northeast, of fifty-four hours' duration, brought a heavy sea from that quarter, without disclosing any drift to other ice. Dark *nimbus* clouds and water-sky invested the north-western horizon, and crowds of migratory birds were observed thronging its waters."

"To the northeast the coasts become mountainous, rising in truncated cones, like the Magdalena Cliffs of Spitzbergen. The furthest distinctly-sighted point was a lofty mountain, bearing N. 5° E. (solar); its latitude, by estimate and intersection, was E. 2° 30'. Its longitude, as thus determined, would give 66° W. (approximative)."

"The extension of the American coast to the southwest was the work of Dr. Hayes and William Godfrey, renewed and confirmed by myself in April of the present year; it completes the survey of the coast as far as the Cape Sabine of Captain Inglefield. The land is very lofty, sometimes rising at its culminating peaks to the height of two thousand five hundred feet. The travel along the western and north-western coast was made for the most part upon the ice-foot. One large bay, in lat. 79° 40' N., lon. 73° W., by estimate, extended forty miles into the interior, and was terminated by a glacier. A large island occupies the southwestern curve of that bay."

"The operations of the Expedition comprehended the survey and delineation of the north coast of Greenland to its termination by a great glacier; the survey of this glacial mass, and its extension northward into the new land named Washington; the discovery of a large channel to the northwest, free from ice, and leading into an open and expanding area equally free, the whole embracing an iceless area of four thousand two hundred miles; the discovery and delineation of a large tract of land forming the extension northward of the American continent, and the completed survey of the American coast to the south and west as far as Cape Sabine: thus connects our survey with the last-determined position of Captain Inglefield, and completing the circuits of the straits and bay heretofore known at their southernmost opening as Smith's Sound."

As regards this "open and expanding iceless area," here based by Kane on Morton's report, and so often since his day spoken of as the Open Polar Sea, it is but just to quote Kane's impartial judgment:—

"Beyond Cape Constitution all is surmise. The high ridges to the northwest dwindled off into low, blue knobs, which blended finely with the air. . . .

"An open sea near the Pole, or even an open Polar basin, has been

a topic of theory for a long time, and has been shadowed forth to some extent by actual or supposed discoveries. As far back as the days of Barentz, in 1596, without referring to the earlier or more uncertain chronicles, water was seen to the eastward of the northernmost cape of Novaia Zemlia; and until its limited extent was defined by direct observation, it was assumed to be the sea itself. The Dutch fishermen above and around Spitzbergen pushed their adventurous cruises through the ice into open spaces, varying in size and form with the season and the winds; and Dr. Scoresby, a venerated authority, alludes to such vacancies in the floe, as pointing in argument to a freedom of movement from the north, inducing open water in the neighborhood of the Pole. Baron Wrangell, when forty miles from the coast of Arctic Asia, saw, as he thought, a vast 'illimitable ocean,' forgetting for the moment how narrow are the limits of human vision on a sphere. So, still more recently, Captain Penny proclaimed a sea in Wellington Sound, on the very spot where Sir Edward Belcher has since left his frozen ships; and my predecessor, Captain Inglefield, from the mast-head of his little vessel, announced an 'open Polar basin,' but fifteen miles off from the ice which arrested our progress the next year.

"All these *illusory* discoveries were no doubt chronicled with perfect integrity; and it may seem to others, as, since I have left the field, it sometimes does to myself, that my own, though on a larger scale, may one day pass within the *same category*."

PREPARATION OF HIS BOOK.

On Kane's return he wrote to his old friend, Hon. J. P. Kennedy: "My health is almost absurd; I have grown like a walrus." He set himself immediately on the laborious task of preparing the Narrative of the Expedition; but the change from an active life to unremitted sedentary pursuits soon told upon his health. To carry through in six months nine hundred pages of book-matter, supervising also three hundred engravings made from his own sketches, and all this complicated by incessant demands on his time and toil by crowds of letters, was, in his own language, "no fun." In September he wrote to Mr. Childs, his publisher, "the book, poor as it is, has been my coffin." The

sales of the first year of these volumes reached the number of sixty-five thousand copies, realizing the sum of sixty-five thousand dollars copy-right to the author. A brief but able review of the work, written in advance by Mr. Charles Lanman, of Washington, gave a large impetus for the demand; thirty thousand persons entered their subscriptions before the publication of the volumes. The success of their issue has not surprised those who have shared in the wide interest of Arctic Exploration, nor even the general reader outside of this circle. For the volumes contain not a single page devoid of historical or scientific interest, and, although presenting the form of a journal, are unusually relieved from the rigid detail of an itinerary. With the transparency of truthfulness throughout notes of explorations of such value, the explorer and writer, by his very constitutional peculiarity, embodied his descriptions in poetic prose, his pen sketching incidents of the day, as his pencil did the lights and shades of scenery forming illustrations of the volumes. Of these sketches one of his company, Mr. H. Goodfellow, says: "They were nearly all made on the spot, the more elaborate of them finished in the cabin. It is difficult to conceive that the picture of Sylvia headland is not engraved from a photograph; and the portraits of the Eskimos equally excellent." Hamilton, whose artistic skill largely increased their interest, in a letter to Dr. Elder, Kane's biographer, comments specially on "the icebergs near Kosoak," "the great glacier of Humboldt," "Weary Men's Rest," "Beechey Island," and the "Three Brother Turrets," and "Tennyson's monument"; saying generally of all, that whether executed with every appliance or with half-thawed ink and greasy paper, or paste-board accidentally picked up among the rubbish of the ship's store-room, they alike present the faithful record of the most essential features of the subject. The original sketch of Tennyson's monument is of the slightest description, and in lead pencil.

"Hamilton adds, 'Now, every one accustomed to study nature practically is aware of the extreme difficulty of rendering the peculiar texture and tone of old, time-worn, weather-beaten rock, sandstone, crushed débris,' etc. Its successful rendition is one of the most difficult achievements of landscape art. In the sketch of the subject alluded to, these

qualities (notwithstanding the coldness and sickness suffered at the time of executing it, mentioned by the lamented navigator in his journal) are secured to an extent that would be creditable to the most skilful artist; every fragment is jotted down with a perception and feeling which seize the special character of the minutest particle defined, and yet its minuteness in no way conflicting with the grandeur of the subject."

The power of graphic description in the writer himself, already referred to in the notice of the first Expedition, is yet more marked in the two later volumes. The extracts here given are descriptive, — the first of a perilous passage through the floe, the second of the great glacier of Greenland:—

"August 20, 1853, it blew a hurricane. We had seen it coming, and were ready with three good hawsers out ahead and all things snug aboard. Still it came on heavier and heavier, and the ice began to drive more wildly than I thought I had ever seen it before. I had just turned in to warm and dry myself during a momentary lull, when I heard the sharp twanging snap of a cord: our six-inch hawser had parted, and we were swinging by the two others, the gale roaring like a lion. Half a minute more, and twang, twang, came a second report; I knew it was the whale-line by the shrillness of the ring. Our noble ten-inch manilla still held on, and the crew were loud in its praises. We could hear its deep æolian chant swelling through all the rattle of the running-gear and moaning of the shrouds. It was the death-song. The strands gave way with the noise of a shotted gun; and in the smoke that followed their recoil we were dragged out by the wild ice at its mercy. . . .

"At seven in the morning we were close upon the piling masses. We dropped our heaviest anchor with the desperate hope of winding the brig, but there was no withstanding the ice torrent that followed. We had only time to fasten a spar as a buoy to the chain and let her slip. So went our best bower.

"Down we went upon the gale again, helplessly scraping along a lee of ice seldom less than thirty feet thick. One floe measured by a line, as we tried to fasten it, more than forty. One upturned mass

rose above our gunwale, smashing in our bulwarks, and depositing half a ton of ice in a lump on deck. But a new enemy came in sight. Directly in our way, just beyond the line of floe-ice against which we were alternately sliding and thumping, was a group of icebergs. We had no power to avoid them; and the only question was, whether we were to be dashed in pieces, or whether they might not offer some providential nook of refuge from the storm. . . .

“A broad scone piece, or low water-washed berg, came driving up from the southward. The thought flashed upon me of one of our escapes in Melville Bay; and, as the scones moved rapidly close alongside, McGary managed to plant an anchor on its slope and hold on to it by a whale-line. It was an anxious moment. Our noble tow-horse, whiter than the pale horse which seemed to be pursuing us, hauled us bravely on, the spray dashing over his windward flanks, and his forehead ploughing up the lesser ice as if in scorn. Never did heart-feeling men acknowledge with more gratitude their merciful deliverance from wretched death. . . . The day had its full trials, but more were to come. A flaw drove us our shelter, and the gale soon carried us beyond the end of the lead. We were again in the ice. Our jib-boom was snapped off in the cap; we carried away our barricade and stanchions, and were forced to leave our little ‘Eric,’ with three brave fellows, out upon the floes behind us. . . .

“A little pool of water at length received us. It was just beyond a lofty cape that rose up like a wall, and under an iceberg that anchored itself between us and the gale. And here, close under the frowning shore of Greenland, ten miles nearer the Pole than our holding-ground of the morning, the men turned in to rest. . . .

“As our brig, borne on by the ice, commenced the ascent of the berg, the suspense was oppressive. The immense blocks piled against her, range upon range, pressing themselves under her keel, and throwing her upon her side, till, urged by the successive accumulations, she rose slowly and as if with convulsive efforts along the sloping wall. Shock after shock, jarring her to the very centre, she continued to mount steadily on her precarious cradle. But for the groaning of her timbers you might have heard a pin drop. And then as she settled down into

her old position, quietly taking her place among the broken rubbish, there was a deep breathing silence, as though all were waiting for some signal before the clamor of congratulation could burst forth."

THE GREAT GLACIER.

The great glacier of North Greenland, approached by McGary and Bonsall in 1853, was visited and surveyed by Dr. Kane in April of the year following. . . . "My recollections of this glacier are very distinct. The day was beautifully clear, and I have a number of sketches made as we drove along in view of its magnificent face. I will not attempt to do better by florid description. Men only rhapsodize about Niagara and the ocean. My notes speak only of the long and ever-shining cliff, diminished to a well-pointed wedge in the perspective; and again, 'of the face of glistening ice, sweeping in a long curve from the low interior, the facets in front intensely illuminated by the sun.' But this line of cliff rose in solid glassy wall three hundred feet above the water level, with an unknown unfathomable depth beneath it; and its curved face, sixty miles in length, from Cape Agassiz to Cape Forbes, vanished into unknown space at not more than a single day's railroad travel from the Pole. The interior which commands, and from which it issues, was to the eye unsurveyed *mer de glace*,—an ice ocean to the eye of boundless dimensions."

"It was in full sight,—the mighty crystal bridge which connects the two continents of America and Greenland. I say continents; for Greenland, however insulated it may prove to be, is in mass strictly continuous. Its least possible axis, measured from the line of this glacier in the neighborhood of the 80th parallel, gives a length of more than twelve hundred miles, not materially less than that of Australia from its northern to its southern cape. Imagine now the centre of such a continent, occupied throughout nearly its whole extent by a deep, unbroken sea of ice, that gathers perennial increase from the water-shed of vast snow-covered mountains, and all the precipitations of the atmosphere upon its own surface. Imagine this, moving onward like a great glacial river, seeking outlets at every fiord and valley, rolling icy cataracts into the Atlantic and Greenland seas, and having

at last reached the northern limit of land that bore it up, pouring out a mighty torrent into unknown Arctic space. It is thus, and only thus, that we must form a just conception of a phenomenon like this great glacier. I had looked for such an appearance, should I ever be fortunate enough to reach the northern coast of Greenland, but now that it was before me, I could hardly realize it. I had recognized in my quiet library at home the beautiful analogies which Forbes and Studer have developed between the glacier and the river; but I could not at first comprehend this complete substitution of ice for water. It was slowly that the conviction dawned on me that I was looking upon the counterpart of the great river system of Arctic Asia and America. Yet here were no water-feeders from the south. Every particle of moisture had its origin within the polar circle, and had been converted into ice. There were no vast allusions, no forest or animal traces borne down by liquid torrents. Here was a plastic, moving, semi-solid mass, obliterating life, swallowing rocks and islands, and ploughing its way with irresistible march through the crust of an investing sea."

The publication of Kane's preliminary Report had sufficed for the creation of an immediate and widespread interest in the work which had been accomplished. The Secretary of the Navy commended the results of the explorations as worthy of the attention and patronage of Congress, and spoke of the cruise as an advance in the frozen regions far beyond those of Kane's intrepid predecessors; adding: "His residence for two years with his little party far beyond the confines of civilization, with a small bark for his home, fastened with icy fetters that defied all efforts for emancipation, his sufferings from intense cold, and agony from dreadful apprehensions of starvation and death for that space of time, — his miraculous and successful journey in open sledges over the ice for eighty-four days, — not merely excite our wonder, but borrow a moral grandeur from the truly benevolent considerations which animated and nerved him for the task."

Immediately following the annual Report from which this language is cited, a correspondence had ensued between the English Ambassador, Mr. Crampton, and the State Department, in which Mr. Crampton

offered for her Majesty's Government its cordial congratulations for Kane's safe return, with the assurances of the sincere gratitude of the Government and the nation to him and to Mr. Grinnell for their generous exertions and their liberality, and the best thanks to the Government of the United States for affording aid to the Expedition in search of Sir John Franklin. The further statement of Mr. Crampton, that her Majesty's Government felt desirous to present some acknowledgment to Dr. Kane and Mr. Grinnell for their generous exertions, resulted in an Act of Congress permitting the reception of such tokens as her Majesty's Government might see fit to present to Dr. Kane and the officers who served with him in that Expedition. The Queen's Medal, commemorative of their services, was accordingly struck for the officers and men of the "Advance." To Mr. Grinnell a large and costly Silver Vase was presented, "as a token of the sincere gratitude and esteem of the British Government for his exertions and munificence." * The Resolution of Congress, of a later date, authorizing the Secretary of the Navy to cause to be struck and presented to the officers and men such medals as should express "the high estimate in which Congress holds their, respective merits and services," was unhappily accompanied by no appropriation to carry it into effect. The Legislatures of Pennsylvania, New Jersey, and Maryland unanimously voted handsome acknowledgments, in the form of Resolutions communicated to Congress, the Executive, the officers, and the patrons of the Expedition. In the Journal of the Royal Geographical Society, for the year 1856, and in the Bulletins of the Société de Géographie of 1858, will be found

* At the United States Centennial held at Philadelphia, 1876, to the writer was assigned, by the late Admiral Davis, the pleasing duty of placing for the United States Naval Observatory an exhibit of American Arctic Exploration. In the Kane section of this, among a number of other mementoes of the several Expeditions, were placed Dr. Kane's sextant, rifle, furs, and kyak; copies of the volumes of the two Expeditions, with the original sketches finished by Hamilton, loaned by Mr. R. M. Grinnell; the boat "Faith," repaired at the cost of Mr. G. W. Childs;—and photographs of the medals awarded, and of the vase presented to Mr. Henry Grinnell by the British Government. Mr. Amos Bonsall, one of the survivors of the Second Expedition, loaned his medal received from the Queen, and Mr. Patterson, the handsome marble bust of Dr. Kane. The opportunity of the exhibit was secured by the kindness of these and other relatives of the explorer, among whom were Mr. R. P. and General and Mrs. T. P. Kane, and Mr. F. J. Dreer and Mr. H. J. Taylor.

the Awards of their highest medals. The medal of the London Society was received for Kane from Admiral Beechey, R.N., by United States Minister Dallas; that of the Paris Society was transmitted to Dr. Kane's relatives after his death.



Shortly after the issue of Kane's volumes from the press, Lady Franklin, in a renewed correspondence, intimated her wish that he equip another expedition, of which, by consent of the Admiralty, he was to take command; but, by the advice of Mr. Kennedy and other friends, he reluctantly declined the honor, saying of his mother's desire that he should abandon it, "Other persuasion I can resist, but this settles the question." In the weary search for health he sailed for England, where he received much kind attention, but almost immediately found his strength plainly on the decline. November 17, he returned to America by way of Havana, at which city he breathed his last, February 10, 1857.

Perhaps no citizen acting as Dr. Kane had acted, chiefly in the private capacity of an explorer and traveller, has received greater tributes of respect during his life or at death. At Havana his remains, followed by more than eight hundred of the military and

citizens, were received by the Governor of the city and his suite, and escorted to their embarkation for New Orleans, and at that city, Louisville, Cincinnati, Columbus, Baltimore, and Philadelphia full honors were rendered by very large military and civic processions. In the last-named city the remains lay in state in Independence Hall until the final obsequies at the Second Presbyterian Church of which his parents were members, and in which he had been baptized. Among the pall-bearers were his life-long friend, Mr. Grinnell; Mr. Peabody, also invited to this duty, unhappily had not received his invitation.

Dr. Kane's religious belief was not only decided, but frequently expressed in the most public and fitting manner. His life was full of confidence in God. Journalizing the incidents of a day of severe trial, he wrote: "I never lost my hope; I looked to the coming spring as full of responsibilities, but I had bodily strength and moral tone enough to look through them to the end. A trust based on experience as well as on *promises* buoyed me up at the worst of times. Call it fatalism, as you ignorantly may, there is that in the story of every eventful life which teaches the inefficiency of human means and the *present* control of a Supreme agency. See how often relief has come at the moment of extremity, in forms strangely unsought,—almost, at the time, unwelcome; see, still more, how the back has been strengthened to its increasing burden, and the heart cheered by some conscious influence of an unseen Power."

Setting out on the return journey home, among the duties established by precise regulations were "daily prayers, both morning and evening, all hands gathering round in a circle and standing uncovered." Of this exercise Wilson, one of the party, says: "While the rest of the party surrounded the sledge with uncovered heads, Dr. Kane rendered thanks to the great Ruler of human destinies for the goodness he had evinced in preserving our lives while struggling over the ice-desert, exposed to a blast almost as withering as that from a furnace. Our Commander poured forth ready and eloquent sentences of gratitude in that lonely solitude, whose scenery offered nothing to cheer the mind and everything to depress it."

In the near approach of death he was tranquil and composed. Every day—"two or three times every day—he must hear the words of life from the lips of her who had taught his own to lisp his infant prayer;" and if Morton's kind occupations around his bedside interrupted her, he always expressed his fixed interest in his mother's readings by saying, "Go on, mother; never mind Morton."

The two Grinnell Expeditions, which have now been presented, have shown but little realization of the hopes entertained at their sailing, so far as the relief of Franklin was part of their purpose. Lieut. DeHaven would doubtless have secured further results but for the strange non-existence of any of those documents which it was to be expected that such an officer as Franklin would have deposited in some cairn in the Arctic regions. If deposited, they were destroyed by the Eskimos. Dr. Kane was cut off from the possibility of even crossing over to the east coast by the fickle ice and the intense sufferings of disease and want. But these overruling circumstances detract nothing from the worthiness of the original purposes of these expeditions, or from the fidelity of the officers and men engaged in them. Still less can they diminish the honor of the discoveries claimed and rightfully vindicated by Kane and by that faithful archivist, the late Col. Peter Force, of Washington, D.C.; or the value of the explorations and surveys.

CHAPTER IV.

EXPLORATIONS OF LIEUT. JOHN RODGERS, U. S. N.

THE EXPLORATION OF THE "VINCENNES" A PART OF THE UNITED STATES EXPEDITION UNDER COMMANDER RINGGOLD. — APPROPRIATION BY CONGRESS. — OBJECTS. — SECRETARY KENNEDY'S INSTRUCTIONS. — SICKNESS OF COMMANDER RINGGOLD. — LIEUTENANT RODGERS SUCCEEDS TO THE COMMAND. — LOSS OF THE "PORPOISE." — THE "VINCENNES" LEAVES HONG KONG FOR HER ARCTIC CRUISE. — ARRIVES AT PETROPAULOVSKI. — CONDITION OF THE TOWN. — ENTERS BEHRING STRAITS. — LEAVES A PARTY UNDER LIEUTENANT BROOKE AT GLASSENAPP. — HABITS AND CUSTOMS OF THE NATIVES. — THE "VINCENNES" IN THE ARCTIC SEA. — ANCHORS IN LATITUDE 72° 5' NORTH. — SAILS OVER THE TAIL OF HERALD SHOAL AND LOCATES HERALD ISLAND. — CAN SEE NO TRACE OF PLOVER ISLAND. — APPROACHES WRANGELL LAND. — RETURNS TO ST. LAWRENCE BAY AND GLASSENAPP FOR LIEUTENANT BROOKE'S PARTY. — ARRIVES AT SAN FRANCISCO OCTOBER 13, 1855. — SUGGESTIONS FOR THE PUBLICATION OF THE FULL NARRATIVE.

WHILE Lieutenant Hartstene was nearing the port of New York with the rescued party of Dr. Kane on board the "Release," the "Vincennes," under Commander John Rodgers, was returning from a cruise in the Arctic Seas on the western side of the Continent. The ship came into San Francisco October 15, 1855, two days after the arrival of Kane at the Brooklyn navy-yard.

The very important explorations and surveys made on this cruise were in the prosecution of the original plans of the United States Surveying and Exploring Expedition which had left the United States under Commander Cadwalader Ringgold, in the year 1853. For this Expedition, Congress, by a section of the Naval Appropriation Bill, had appropriated the sum of one hundred and twenty-five thousand dollars, for the building and purchase of suitable vessels, and for the prosecution of a survey and reconnoissance for naval and commercial



John Rodgers

purposes, of such parts of Behring Straits, of the North Pacific Ocean, and of the China Seas as are frequented by American ships and trading vessels.

The Expedition consisted of the sloop-of-war "Vincennes," the screw steamer "John Hancock," the brig "Porpoise," the schooner "J. Fenimore Cooper," and the store-ship "J. P. Kennedy." Lieutenant John Rodgers, then on duty under the Coast Survey, was detached and ordered to command the "Hancock," at the request of Commander Ringgold, who accepted his offer as a volunteer, and cordially recommended him to the Navy Department. The Commander himself had, from the beginning of the proposition for the survey, manifested great interest in it, having been on duty with the Expedition under Lieutenant Wilkes in the South Seas, in the years 1838-1842.

The squadron sailed from Norfolk June 11, 1853. The primary object of the Expedition, laid down in the instructions of Secretary Kennedy, was the promotion of the great interests of commerce and navigation, as referred to in the Act of Congress; special attention being also directed to the increasing importance of the whale fisheries in the neighborhood of Behring Strait. The thorough examination of that great outlet was expected, as well as that of the adjacent coasts of North America and Asia, including the Seas of Behring and Anadir, and the Aleutian archipelago, with the east coast of Kamtschatka. The Commander was authorized to go as far north as he should think proper, and devote as much time to the complete performance of any part of the work as should be necessary; but was instructed also to take all occasions not incompatible with these high objects, for the extension of the boundaries of scientific research. For the conduct of such research, and for experiments, no special instructions were laid down, nor were the Naval Officers or the Scientists of the Expedition limited in these to their respective special spheres. All were expected to co-operate harmoniously in the prosecution of physical investigations, embracing those of temperature at different elevations and in different latitudes, with specific references to barometrical, hygrometric, and mometric observations, and those of the aurora borealis, of parhelia, and the mirage. Eminent naturalists were to be attached to

the Expedition, and suggestions offered by the chief Philosophical, Scientific, and Literary institutions of the United States made part of the instructions. Mr. William Stimpson was appointed to be the Naturalist of the Expedition; Mr. E. W. Kern, its artist; Mr. C. Wright, botanist; Mr. W. D. Stuart, secretary and draughtsman; and Mr. Anton Schöenborn, instrument-maker.

In regard to this Expedition, as well as Dr. Kane's, that under the command of Commodore Perry, and the expedition to the Paraguay waters by the "Water-witch," under Lieutenant Page, a distinguished Naval Officer, is quoted, in Tuckerman's life of Secretary Kennedy, as saying that all were either the inception of the Secretary himself, or as having received from him such intelligent recognition and support as to have made its impress upon not only our own history, but on that of other nations. In Mr. Kennedy's Annual Report of December 2, 1852, he had expressed his interest in the relations of the Navy to such objects, by saying that "the constant employment of ships and men in the promotion of valuable public interests, whether in defence of the honor of our flag or the exploration of the field of discovery and the opening of new channels of trade, or in the enlarging of the boundaries of science, will be recognized both by the Government and the people as the true and proper vocation of the Navy; and as the means best calculated to nurse and strengthen the gallant devotion to duty which is so essential to the character of accomplished officers and so indispensable to the effectiveness of the Naval Organization." From the outset of his administration of the Navy Department his journal indicates the greatest activity, and he notes with obvious zest his arrangement for these expeditions. The outfit, manning, and instructions were both liberal and sagacious, and their respective Commanders warmly acknowledged their obligations for his scientific zeal as well as official courtesy.

Commander Ringgold was advised that the resident Russian Minister had tendered the assurance of an interest felt by his Government in the Expedition, which might expect assistance, hospitalities, and refreshments whenever needed within the Russian domain. An exploring squadron from that Government was announced as about

setting out. Russian Charts of regions to be visited would be courteously offered.

The ships named above proceeded to the Cape of Good Hope, *via* Madeira and the Cape de Verde Isles. In the early part of November the "Hancock," the "Fenimore Cooper," and the store-ship sailed for Batavia, and the "Vincennes" and "Porpoise" to Hong Kong, *via* Australia. After a survey of Gaspar Straits and other localities, in July the squadron reunited at Hong Kong.

In the month of August of the following year, 1854, a reorganization of the Expedition became necessary, the failing health of Commodore Ringgold requiring his return to the United States; the command devolved upon Lieutenant John Rodgers, the next in rank. After his transfer to the command of the "Vincennes," the complement of his officers for the cruise consisted of Acting Lieutenant John M. Brooke, Astronomer; Acting Lieutenants Francis A. Roe, Thomas Scott Fillebrown, John H. Russell, and Fleet Surgeon William Grier, Assistant Surgeon W. L. Nichol, and Purser W. B. Boggs; with the Corps of Scientists already named.*

Early in September of the same year, the "Vincennes," Commander Rodgers; the steamer "John Hancock," Acting Lieutenant Henry K.

* "VINCENNES'" OFFICERS NAVAL RECORD.—Lieutenant commanding, John Rodgers, warranted midshipman, April 18, 1828; promoted to be passed midshipman, June 14, 1834; to be lieutenant, Jan. 28, 1840; to be commander, Sept. 14, 1855; to be captain, July 16, 1862; to be commodore, June 17, 1863; to be rear admiral, Dec. 31, 1869; died at Washington, May 5, 1882. Acting lieutenant, John M. Brooke, warranted midshipman, March 3, 1841; passed midshipman, Aug. 10, 1847; master (in the line of promotion), Sept. 14, 1855; lieutenant, Sept. 15, 1855; tendered resignation and left the service, April 20, 1861. Acting lieutenant, F. A. Roe, warranted midshipman, Oct. 19, 1841; passed midshipman, Aug. 10, 1847; lieutenant, Sept. 14, 1855; lieutenant commander, July 16, 1862; commander, July 25, 1866; captain, April 1, 1872; commodore, Nov. 26, 1880. Acting lieutenant, John H. Russell, warranted midshipman, Sept. 10, 1841; passed midshipman, Aug. 10, 1847; master, Sept. 14, 1855; lieutenant, Sept. 15, 1855; lieutenant commander, July 16, 1862; commander, Jan. 28, 1867; captain, Feb. 12, 1874. Acting lieutenant, Thomas Scott Fillebrown, warranted midshipman, Oct. 19, 1841; passed midshipman, Aug. 10, 1847; master, Sept. 14, 1855; lieutenant, Sept. 15, 1855; lieutenant commander, July 16, 1862; commander, July 25, 1866; captain, Jan. 6, 1874; commodore, May 7, 1883. Wm. Grier, assistant surgeon, March 7, 1838; passed assistant surgeon, April 14, 1852; medical director, March 3, 1871; surgeon-general, Jan. 30, 1877; retired, Oct. 5, 1878; W. L. Nichol, asst. surg., June 28, 1852; resigned Nov. 21, 1855; W. B. Boggs, purser, Nov. 30, 1852; pay director, March 3, 1871.

Stevens; the "Porpoise," Acting Lieutenant William K. Bridge; and the "Fenimore Cooper," Acting Lieutenant William Gibson, sailed from Hong Kong. The "John Hancock" and "Fenimore Cooper," sailing September 9, were sent to the Peiho River in connection with the visit and negotiations of United States Minister McLane. While so engaged, important surveys were made in that region. When their presence was no longer required by Minister McLane, they surveyed the western coast of Formosa.

The "Vincennes" and "Porpoise" sailed from Hong Kong on the 12th of September for a survey of the Bonin Isles, Ladrone, Loo-choo, and the islands west and south of Japan, and returned to Hong Kong in February, 1855, with the exception of the brig "Porpoise," which parted company from the "Vincennes" September 21, 1854, in mid-channel, between Formosa and China to the northward and westward of the Pescadores. The brig, with every soul on board, perished. She was to have met the "Vincennes" at the Bonin Isles, and Commander Rodgers waited for her there beyond the appointed time. As there were grounds for apprehension of her safety, since both the "Vincennes" and the "Porpoise" had struggled together with the storm of the date named, Commander Rodgers went in search of her, visiting the Loo-choo and other islands and places where it was thought possible she might have been driven by the gale; and afterward the "Hancock" and "Cooper" thoroughly explored the island of Formosa, but without the slightest intelligence of the ill-fated brig.

Referring to her loss in his Report of December 2, 1854, the Secretary of the Navy said of her officers: "They were all young, energetic, and full of professional pride. The service in this calamity has met with a severe loss." The officers referred to were Acting Lieutenants W. K. Bridge, Wm. Reiley, S. J. Bliss, and W. W. Van Wyck; Midshipman G. F. Baber; Assistant Surgeon J. H. Stuart, and Captain's clerk, S. J. Potts, Jr.

In Lieutenant Habersham's volume, entitled "My Last Cruise," Lieutenant Brooke will be found to have communicated this account of the sad disaster:—

"The two vessels in company were struggling with the northeast

monsoons in the China Sea. Occasionally the veering wind and changing barometer indicated the passage of a cyclone. The increasing fury of the wind, and these indications governed the courses of the vessels. At length they found themselves between Formosa and the main, and during the night of the 20th of September they held on near mid-channel; but in the morning the 'Vincennes,' then to leeward, bore up for the Bashee passage. It was presumed that the 'Porpoise' would follow.

"While the 'Vincennes' was thus running before the wind, towing hawsers astern to break the sea should she cross the banks, the 'Porpoise' was enveloped in a driving mist and lost to sight. This separation was regarded as of little moment, for the brig was well-manned, and her officers, individually and collectively, were men of the first ability and courage: you knew them all.

"It is generally understood by seamen that sound vessels are safer alone than in company; for the whole attention of the commander may be devoted to the care of his vessel without those modifications of plan required when acting in concert. In those seas the obscurity of the night rendered it difficult to distinguish light, and the sound of cannon would be lost in the roaring of the wind and waves. Therefore neither surprise nor special anxiety was experienced on that occasion.

"The 'Vincennes,' having passed the Bashee passage, entered the Pacific, and, until her arrival at the Bonin Islands, experienced fine weather. The arrival of the 'Porpoise'—a duller sailor—was daily expected. Meanwhile there came on, at *night*, one of those characteristic storms of the Bonin,—a hurricane or cyclone. It came unheralded, except by the slightly increased sound of the surf on the outer rocks; and it was not until the fitful gusts that, by their peculiar tone are recognized by those who have heard it, swept from the hills over the ship, that we were aware of its proximity. Nearly shut in by mountains, the 'Vincennes,' with lower yards and topmasts struck, and four anchors down, trembled from the vibration of the masts and rigging. There was no shrill whistling of the wind, but a deep and hollow roar; the crests of the waves were caught up and whitened the air with drift. The falling barometer and the veering wind presented

all the indications of a cyclone sweeping towards the north. It was remarked by the ablest seamen of the 'Vincennes' that she, good sea-boat as she was, would scarcely have survived the hurricane at sea.

"In the confined China Sea, — near the Pescadores, the wind blowing toward the coast of China, — it would be singular, indeed, if no vestige of a ship wrecked or lost there should be found. It is not probable that the 'Porpoise' was lost until she reached the vicinity of the Bonins. "She bore the character of a good sea-boat, but was short and deep in the waist, therefore liable to broach to, or to be brought by the lee to fill and founder."

In March, 1855, the Expedition again left Hong Kong for surveying purposes. After surveying the west coast of Formosa, the "Vincennes," the "Cooper," and the "John Hancock" proceeded to Loo-choo, where the three vessels together began the surveys between that island and Japan. Passing on to Simoda, Japan, the surveys were continued; the "Cooper" exploring the western coast of Nippon, and the "Vincennes" and the "Hancock" that part of the sea lying in the path of vessels near the east coast, while the launch of the "Vincennes" under Lieutenant Brooke made a running survey of the coast from Simoda to Hakodadi. From Hakodadi the "Hancock" proceeded to survey the Ochotsk Sea, and the "Cooper" to explore the northern Japanese and Fox and Aleutian islands. The "Vincennes" sailed for Kamchatka to begin thence her Arctic cruise.

THE ARCTIC EXPLORATION.

Of the most important and permanently valuable work of the northern cruise by the "Vincennes," it remains as yet a matter of universal regret that no official or other narrative has been published. In the report of Secretary Toucey of December, 1857, he said: "The work of publishing the survey of the late Expedition to the North Pacific and Behring Straits under Commander Rodgers, is rapidly advancing; engagements have been made with eminent professors in the various branches of natural history, describing the most important specimens brought home by the Expedition. A portion of the hydro-

graphical work is in the hands of the engraver, the rest is in a state of forwardness."

The hydrographic work here alluded to is, however, all that has appeared. The charts issued by the United States Hydrographic Office, Washington, are memorials worthy of the cruise, of the Navy, and of the officers who executed the surveys. Of the Rodgers chart, — the track of the "Vincennes," and her route through Behring Sea and the Arctic Ocean (No. 68 of the charts of the Hydrographic Office), — in his tribute to the late Admiral Rodgers, Secretary Folger says: "Before sighting Wrangell Land, he was met by the ice barriers, and with wise prudence turned his prow homeward, beating his way back against headwinds, and reaching the Straits in time to get through, but marking his zigzag course by a line of soundings on the chart of 'Behring Sea and the Arctic Ocean,' published by the Government over his name, which is still the best authority to those who follow after him, and to which much has been added by those who have imitated his careful methods, but from which nothing has been taken." ["In Memoriam," Treasury Document, No. 277.]

The charts of the list of the Hydrographic Office are: —

No. 54, "Bay of Avatcha, Kamtchatkas and approaches; Nos. 8 and 55, "Aleutian Archipelago," — in two sheets; No. 57, "The Straits of Semiafine in Behring Sea;" No. 60, "St. Lawrence Bay."

No. 68 (as named above), Behring Sea and the Arctic Ocean.

This number, as reissued by Commodore J. C. P. DeKraft, Hydrographer of the Bureau of Navigation, gives an extension of the Northern Asiatic coast, westward to lon. 155° E.; also the tracks and the highest point reached by the "Rodgers," under Lieutenant R. M. Berry, Sept. 18, 1881, lat. 73° 44' N. This position and that of the unfortunate "Jeanette" when crushed by the ice, June 13, 1881, with other indications of recent Arctic Explorations, will be found laid down on the circumpolar map (pocket of this volume).

It has not been found practicable to furnish a reply to the many inquiries which have been made as to the deferring of the publication of the full narrative of this Exploring Expedition of 1853-55, or of its

Arctic cruise; a fair inference may be drawn from the history of like cases, that the non-appearance of the text has been caused by the want of a sufficient appropriation for its issue by the Navy Department. The brief notices which follow would have been most gladly extended or have given place to a fuller history, if such had appeared. They are, however, derived from the letters of the Commander, the Ship's log, and the Reports of the Secretaries of the Navy, with some notes of the camping on shore at Glassenapp, by the party under Lieutenant Brooke, drawn from his courteously loaned memorandum books.

THE NORTHERN CRUISE.

July 8, 1855. — The "Vincennes" arrived at Avatcha Bay, Siberia, in which lies the Port of Petropaulovski. The bay was found to be as described in the sailing directions, large and affording good anchorage. The village presented a singular appearance, its houses, about one hundred in number, being built of logs hewn square, many of them having red roofs; the better class covered with sheet-iron, the red lead being probably designed as a protection from rust. The village is situated at the head of a land-locked basin, formed by a high ridge of land curving out and rounding from the main, and then running parallel to it. A low sand-spit forms a breakwater across the entrance. On the shoulder of the spit and on the promontory of the ridge, were seen the ruins of batteries from which the guns had been removed.

A boat came off with a Mr. Case, an American resident, who reported the town deserted, and that the public property had been destroyed, and that of private persons wantonly injured by the French. On a visit by the officers of the "Vincennes," the burned houses presented a mournful appearance, and the deserted mansion of the Governor scarcely less of discomfort. This dwelling also was of logs caulked with oakum, and lined with painted canvas; its heating had been from Russian stoves, which, as massive squares of brick-work, maintained a constant temperature. A stream of clear water, supplied from the melting snow of the hills, formed a small cascade in the garden, where gooseberry bushes were just shedding their blossoms, and the straw-

berry beds were verdant. In the streets many dogs were wandering without masters, to die of starvation. Lieutenant Brooke entered in his notes of the visit, that the black embers of the burned houses were a souvenir of the English and the French conflict, the more mournful because the severity of the climate and the cold aspect of the mountains would incline one to think that into such a country men should scarcely carry the cruelties of war. "But the French probably remembered Moscow." In the calm of the evening the scenery was very fine, presenting from one point the wide waters of the bay, the close, calm harbor, the distant and majestic mountains, and the light-hued vegetation, waving with every zephyr. Violets and heartsease were gathered for home letters. During the absence of the officers the seine had been hauled, bringing up one hundred and forty salmon with trout; a king-salmon weighed sixty pounds; the lightest, ten pounds.

The schooner "Fenimore Cooper" came in from a cruise to Actka, one of the Aleutian Islands, which she had visited by orders of Commander Rodgers, under instructions from the Navy Department, to make inquiries for the fate of the officers and crew of the whale-ship "Monongahela," which was lost in the autumn of 1853, in attempting to make her seventy-second passage, in lon. 172 west. Diligent search was made, and the Islands of Segoum and Amoghta, which lie on each side of the passage, were thoroughly examined. At Actka were found several water-casks, supposed to have belonged to the missing vessel, but no tidings of the officers and crew, all of whom are supposed to have perished with the ship.

A visit to the "Vincennes" was made by Captain Martineff, of the Russian Army, who, with another officer, had been sent out by the Russian Government to meet Commander Ringgold and bring Russian charts. On his journey from St. Petersburg, made in seventy days by horse and dog, he had at one time been delayed six days in the snow without fire. His dogs had been driven by a slightly curved stick.

On the 9th, an American ship with a cargo consigned to this port, arrived from New York *via* Valparaiso. On the 13th, the Commander of the "Vincennes" sent as a present to the Governor of Siberia a silver-mounted Sharpe Rifle with ammunition; the "Vincennes" ran

out to sea, taking as an interpreter an old Cossack sixty-seven years of age. The "Cooper" engaged for the same office, for a new visit to the Aleutian group, a Mr. Fletcher, for twenty years an inhabitant of Kamchatka.

Lieutenant Brooke found his first watch on deck in lat. $52^{\circ} 59' N.$, made very pleasant by the beauteous phenomena witnessed. The calm and complete stillness was broken only by the flapping of a sail or the occasional breathing of a seal. "The sky, near the horizon, was orange and violet, the distant land breaking into the arch of colors was dark, and in bold relief tinged with purple. As the sun came up, all changed to crimson and gold, and the light clouds aloft, even in the west, were warm and beautiful. To the west rose the gray land over-towered by the snow-capped peaks, cold as could be. The waterfowl were reflected in the mirror-like sea, and their images were seen at every undulation of the smooth waves; hardly perceptible, long, waving lines diverged on either side as they advanced toward the ship. Seaward, a thin, low haze obscured the sky and sea, which faded like a mirror beneath the cloud."

July 16. — The "Vincennes" encountered thick weather, but without rain; at noon, when it lightened up, Behring Island was seen bearing S. E. The Commander regretted that he was unable to wait for clear weather to locate the island, which is found differently placed on the Russian and English charts. From this date up to the close of the month, adverse easterly winds prevailed, with the exceptional calms accompanied by the usual fogs. On the 28th, when Lieutenant Brooke sounded for deep-sea dredging,* Saxton's thermometer was bent to the lead, and sent down, all quills included; at nine hundred fathoms only, it reached bottom, the shot detached itself, and both the quills and bore

* In Sir C. W. Thomson's "Depths of the Sea," page 211, will be found the following:—

"About the year 1854, Passed-Midshipman J. M. Brooke, United States Navy, who was at the time doing duty at the Observatory, proposed a contrivance by which the shot might be detached as soon as it reached the bottom, and specimens brought up in its stead. The result of the suggestion was Brooke's 'Deep-Sea Sounding Apparatus,' of which all the more recent contrivances have been to a great extent modifications and improvements, retaining its fundamental principle, the detaching of the weight." The last of these remarks will be found confirmed by the Reports of the Naval Officers engaged in the work

of the rod were hauled up full, a greenish sediment revealing under the microscope, living animals; as on a previous day, when the sounding had been one thousand seven hundred fathoms, the infusoria were proved to have come from the lowest depth by the selection of a portion of the sediment from the middle firmly-packed section. The animals in this section were the most abundant.

August 1. — Behring Straits were entered after passing between St. Lawrence Island and Cape Tchaplín in a thick fog without seeing land. The ship hauled in for Semiavine Straits on the Asiatic side, where the Commander had determined to leave a party under Lieutenant Brooke to make astronomical and other observations. In the afternoon, land was suddenly seen close aboard, without the position of the ship being well known, as they had no observations. Lieutenant Brooke's notes and Commander Rodgers' letters say: "There never was a more gloomy voyage as far as the absence of the sun is concerned; as to daylight, we have enough of that, for the night is only from eleven till one." The "Vincennes" heading N. by W., going six knots, expected by noon to make the land, but the continually rising and never-clearing fog entirely shut out the distant horizon. After several attempts to gain the harbor, frustrated by losing sight of the ship's track on which eyesight was necessary for safety, by the help of Lutke's chart and that of an intelligent Tchuktschi, August 4, anchorage was found in Glassenapp, lat. 65° N., lon. $172^{\circ} 35'$ W. The flag of Lieutenant Russell, who had gone forward in the boats, was already up. From the deck some mound-like structures, the huts of the Tchuktschis, were seen, with what appeared the framing of others, — eight or ten whale-ribs set upon end close together. A large number of the men, with their women and children, crowded around the ship in their *baidars*, skin-boats; they were all dressed in furs, generally with coats of deer-skin, and pantaloons of seal-skin, over which they wore looser frocks made of the intestines of whales or other sea animals. They were tall and

of Sounding, the latest being those of Lieutenant-Commander C. D. Sigsbee, and Lieutenant-Commander J. R. Bartlett, United States Navy, of the work done on the "Blake" in the Gulf of Mexico; the modifications used by them being chiefly the use of the wire and of Sir W. Thomson's improvement of the valve invented by Sigsbee.

had large heads; the flatness of their faces, relieved only by prominent cheekbones, making them appear singularly heavy. Their hair was shorn, except a broad ridge over the forehead. "The women were not ugly, some of them quite pretty, particularly when they smiled; and when asking for anything, they put on so winning an air and smiled so sweetly, and were so arch and amusing, the officers could not resist them. Some had their faces slightly tattooed with blue lines from the lower lip to the chin, or on the cheeks; their hands and feet were very delicately formed, but not clean. They wore their hair long, plaited in two pendants, adorned with little strings of red and white beads."

The officers of the ship were much surprised to see persons of such fair complexions and otherwise agreeable appearance living in such a country and subjected to such exposure. The party made ready exchanges of walrus teeth, lances, and harpoons made of the ivory of the moose, for needles, thread, silk, and like articles; tobacco being chiefly desired. All could either smoke or chew, and for half a plug of the weed they willingly gave weapons which must have cost them weeks of patient labor. They inquired for grog, of which, however, very little was given to them. This race are spoken of in the letters of Commander Rodgers "as a fine-looking set of men, of free and bold bearing. Of all the Asiatic races inhabiting Siberia, they only have not submitted to the tribute of peltries demanded by the Russians."* Though still in a great measure Nomads, they have fewer

* Lieut. Hovgaard, in his "Nordenskiöld's Voyage," pp. 117-119, says of this race: "When Yermak Timofeyeff, the Kossack chief, in 1579, fled and crossed over the Ural Mountains, he and his successors subdued in the course of a century nearly all the territory which we call Siberia; but in the outlying northeastern part of the Old World, a small, courageous, but savage race of people kept the restless conquerors at bay. This was the Chuckches.

"Before the conquest of Siberia the Chuckches lived in almost constant warfare with the other races in the northeastern districts, in consequence of the raids of one tribe upon another. The Chuckches were generally the victors in these wars, and gained great renown for bravery, and were considered almost invincible. In the middle of the last century, however, Pavlazki made a successful inroad into their country, and after several defeats, and considerable losses, they retreated into their inhospitable mountain regions, where the victors could not pursue them without great difficulties and endless dangers.

"The Russians were satisfied with subduing the smaller and nearest tribes. A long time elapsed before they succeeded in entering into any friendly communication or estab-

characteristics accompanying that mode of life than the wandering Tunguses. It may be remembered that they were serviceable to Captain Moore, of H. B. M. ship "Plover," of the Franklin Relief Expedition, 1848-52, when he anchored near them.

The Commander of the "Vincennes," on going ashore with Lieutenant Brooke to select a position for the camping of the observing party referred to, found the huts to be made of hide, patched over frameworks of wood and whalebone. They were small, square or rectangular apartments, with inner roofing of furs for sleeping-places. The culinary and other utensils were suspended from the roof; in the centre was a flat stone, over which hung iron kettles. The ground was strewn with bones of the moose.

The hesitancy on the part of Commander Rodgers to leave the observing party at this place was overcome by the prompt desires of the Lieutenant to secure results which the unfavorable weather had thus far continuously forbidden. On the 5th, at an early hour, the sun shining cheerfully, and scarcely a breath of wind stirring, the transit house was landed, with two tents, and spars, and sails as materials for building a commodious house. Lieutenant Brooke obtained morning altitudes and one at meridian, beside several near it, with which last observations Lieutenant Russell's agreed. The station was on the shore, at the head of the bight which this little bay forms. Provisions were landed for eleven persons for two months, and the party were thoroughly equipped for defence, by the gun of the launch, twelve-

lishing any trade with the Chuckches. They were still suspicious of the Russians, and at first they only showed themselves in great numbers, and fully armed, on the borders; only after the experience of many years, and many proofs of the sincerity of the Russians, they appeared to feel more and more secure, and in Wrangell's time they came fearlessly with their women and children to the distant Russian fairs over the borders, until a mutually profitable trade was developed. Another important result of this intercourse with the Russians was the softening influence of the habits of civilized Europeans upon the Chuckches, and their former savagery vanished to a great extent.

"The hostile feeling has now completely died out, and of late years the natives have also been greatly influenced by their intercourse with the Americans. They do not like the American whalers, as they interfere with their seal and walrus hunting; but a company from San Francisco sends every year some ships to barter with them for walrus teeth and similar articles, and these traders the Chuckches look upon as good friends, as they in exchange get brandy, tobacco, cloth, etc."

pounder howitzer, fifty-three rounds of canister and shell, three carbines, three muskets, and three rifles, with about one thousand cartridges and their appurtenances. A whaleboat-built cutter was also left, in which to escape in case of accident to the ship.

At the time of landing, the natives came around them in crowds, the children carrying many things from the boat, and thus assisting in placing the stores under shelter. Brooke did not fear the people, who seemed to be honest and independent. Commander Rodgers and Lieutenant Fillebrown took some observations from the highest peak of the islands, and Mr. E. R. Knorr, now of the Hydrographic Office, Washington, measured a base line on the peninsula. On the next day a clear sky permitted Lieutenant Brooke to get a very good set of equal altitudes, and in the evening, by the Planet Jupiter, he got the transit approximately into the meridian. On the 7th the Commander of the "Vincennes" came ashore to see that the party were not in want of anything, and to bid farewell; he informed the chief of the village that the party would remain on shore until the return of the ship, and that he would reward him if they were kindly treated, but punish any offenders. The chief answered, "All is very good." There was, however, little encouragement, so far as supplies of game or reindeer might be needed, and there were indications of insincerity. But Lieutenant Brooke had no apprehensions. The "Vincennes" got under way.

The Lieutenant found himself located on a Peninsula, which was almost a meadow land, luxuriantly carpeted with grass, and blue, white, and yellow blossoming flowers. The harbor itself, level and containing several square miles, is formed by a low and sickle-shaped Peninsula, covered with grass; its shores gravelly. High mountains rose on the in-shore side; snow and ice lay in the hollows, but were beginning to melt, and the pools of fresh water stood upon the plain.

The party under the Lieutenant consisted of two of the naturalists of the surveying expedition, Messrs. Stimpson and Wright, Mr. Kern, the artist, three marines, and five sailors, one of whom was the old Cossack. Commander Rodgers "had in the marked prudence and firm-

ness of their Chief the strong assurance that he would find them safe on his return from the North."

The month during which they remained at this station, awaiting the return of the "Vincennes," was occupied by the respective officers for observing purposes as closely as the unfavorable weather permitted, and it is gratifying to learn that their work, with that of other portions of the Expedition, has been called for by the Smithsonian Institution for profitable use. Friendly intercourse with the natives who visited the camp, and with their villages, was almost continuously maintained without difficulty; the only exceptions were those of one or two occasions on which a native had been freely indulging from the supplies of rum which had been so inexcusably furnished by traders previous to this visit. The party under Lieutenant Brooke had frequent opportunities of witnessing the habits, customs, and manners of the natives, their means of obtaining their food, their manufacture of articles for sale to the traders, and their varied amusements. The last-named of these presented some characteristic differences from those generally described by explorers in other Arctic regions. In their amusements of running and wrestling, the good humor which prevailed is spoken of by Lieutenant Brooke as remarkable, the contests ending with a smile from both victor and vanquished.

In performances of another and very singular character, it seemed to him that what was done was in imitation of the antics of wild beasts, — bears, walrus, and seals. In his journal he says: "Ea-ack-til-ha treated us with an exhibition singular enough, and withal very theatrical; he stood out before us, and, throwing back his head, seemed in an agony of strangulation; his eyes upturned, squinted and rolled in their sockets like evening lightning; all his muscles were rigid, and he trembled as if galvanized. A noise was heard like that of a drowning man, — a gurgling sound, but loud. He slapped his hands violently against his head, then, extending his arms by his side, fell like a log upon his back. Then his feet went up in the air, and rolling on, he seemed to spring up, feet foremost, his head upon the ground. He was dressed in fur, and the long hair about his neck, with the savage character of the decorations of his person, produced an extraordinary impression; one

could hardly realize that he was the same man who came smiling to us afterwards, and exclaimed, '*Met-tchink-Ka!*' "

The skin-boats used in hunting the walrus and the seal are managed, like those of other Arctic natives, by the skill of one who sits in the middle, in a round hole, just large enough to permit easy getting up and down. When getting in, great care is taken by even the most experienced to prevent an upset. In all the boats seal-skins, blown up like small balloons, are used as buoys, life-preservers, or fenders while hunting.

The "Vincennes," in the prosecution of Commander Rodgers' plan of her Northern cruise, entered the Arctic Sea August 11. He had not expected to attempt a voyage to the far North, the field of labor, as he expressed it in his letter to the Department, being rather to the Southward of Cape East than to the North of it. It was utterly impossible to expect to winter in a high latitude, — the ship had but four months' provisions and fuel, — and the Commander was "desirous to return to the work of the surveys at the earliest date consistent with the visiting to the land in about lat. 72° N., lon. 175° W., as placed upon the Admiralty charts from the Report of H.B.M. frigate 'Herald,' Captain Kellett; with examining Herald Island, seen by the same ship, but not explored; and the endeavor to reach Wrangell Land as described to Lieutenant Wrangell's companion, Dr. Kyber, on his Polar Exploration of 1824.*

The ship was favored with a strong breeze, but the weather was thick and lowering; she ran on under all sail, getting a cast from the lead every hour. August 11, she encountered a stream of drift-

* In the Narrative of his Expedition to the Polar Sea, 1820 to 1823, by Lieutenant Von Wrangell, of the Russian Navy, on page 342 (Sabine, 2d edition, 1844), will be found the following:—

"Some of the chiefs of the Tchukthi tribes of this coast had spoken much to Dr. Kyber of a more northern land, the lofty mountains of which were visible on very clear days from the place which they called Jakan, and which they described tolerably circumstantially. From their description it appeared that Jakan lay to the Eastward of our present position, and I determined to visit it. On the 8th of April (1824), the weather was clear, and the temperature +25° in the morning and evening, and +36° at noon. After following the coast, which was sixty feet high, for seven versts, we came to a rock

timber, some of the trees of which were so large and numerous that she had frequently to alter her course of seven knots to avoid striking them. She ran over the tail of Herald Shoal, which had less than eighteen fathoms water, and on the 13th passed the island, which appeared dimly between the clouds as two small ones. The weather became foggy, and the ship stood for the North until she ran through the position of the land as given on the Admiralty charts, R.N., and came to anchor in forty-two fathoms, in latitude $72^{\circ} 5' N.$, longitude $174^{\circ} 87' W.$ In a few hours the fog lifted, and a sudden change, peculiar to the Northern regions, flashed across the scene; it was so clear that the horizon appeared without limit. No land or appearance of land could be seen from the royal yards. The water, as far as the eye could reach, was entirely free from ice, but the weather became again foggy. Commander Rodgers, having accomplished what he had proposed, and being assured that a longer exposure of his officers and crew could result in injury only, returned toward Herald Island. On the night of the 14th, the surf was heard sullenly breaking on the shore, and at two in the morning an avalanche thundered down the island which had not been seen. At six A.M., two boats left the ship to make observations for position; the weather, however, unhappily prevented the securing of satisfactory results until further observations were made from on board the ship; but these placed the island in a different position from that given by Captain Kellett, the Southeastern point being fixed by the "Vincennes" in $71^{\circ} 21' N.$, $175^{\circ} 20' W.$ The island was found to have the form of a half-moon, its horns being connected by a less elevated isthmus, which gave the appearance of there being two islands, for the isthmus might be below the horizon, while the extremes are above it. The sides were found

projecting some way into the sea, behind which the shore suddenly becomes low and flat, consisting of gravel and weathered fragments of rock. The place corresponded perfectly, in these and other respects, with the description which the chiefs had given to Dr. Kyber of Cape Jakan. I determined its latitude $69^{\circ} 42'$; and its longitude is $176^{\circ} 32'$ by reckoning, dependent on our observation the day before. We gazed long and earnestly on the horizon in hopes, as the atmosphere was clear, of discerning some appearance of the northern land, which the Tchuktchis affirm they have seen from this place, but we could see nothing of it."

very steep and full of danger, nearly causing the loss of life of an officer who endeavored to climb them, a piece of rock giving way under his foot; the frost had broken up the friable material of the rocks and earth. John Watts, an active man of the boat's crew, and with good eyesight, succeeded in reaching the summit, but no land could be seen in any direction, although the horizon was excellent, and Commander Rodgers was compelled to write: "It would be far pleasanter to confirm the discovery of other land than Herald Island, than to believe that Commodore Kellett was mistaken in his views; yet we were convinced, however unwillingly, that appearances had deceived him. Several times land was reported to us by the man at the masthead, which eventually proved to be only clouds, and sometimes where I knew no land could be seen, since we had passed *through* the position on which it was said to be. On the 15th we ran for Plover Island. The air was clear and bracing, but when half way to the position of the land, as placed on the chart, we were stopped by a barrier of ice. At but half the distance the 'Herald' had been, nothing from the royal yards in the favorable weather we had, could be seen, and I am forced to the conclusion that Plover Island does not exist. Captain Kellett could only give his honest conclusions, and it would have been wrong to omit the notice of such palpable appearances; for any navigator, under the circumstances which controlled his acts, must have followed his course in giving his convictions, and then have left the matter to the investigations of time and the confirmation or rejection of those who should have better opportunities for ascertaining the truth of what he saw as probable."

The log of the "Vincennes" at this period presents a number of items of special interest, some of which are here presented: "August 13, at 7 A. M., the fog lifted. Sent lookouts to the royal yards, and took a careful look around. Could see no appearance of land; horizon to W. N. W. and N. good and clear for a radius of thirty miles. 'Nothing in sight. A bright lookout for land and ice ahead. The 'Vincennes' at anchor, lat. 72° 05' 27" without current; 72° 02' 27," allowing a current of one knot per hour. Southeast by E., lon. 174° 37' 15" W."

The log of the 14th has the minutes, "from eight to meridian,

sounded every hour; each time got bottom with forty-three fathoms; bottom hard. Fired a gun for the purpose of ascertaining by echo our distance from land; — heard no echo. At 3 A.M., the weather very clear and light, a pink and rose-colored band of light rested over the southern horizon at an altitude of about five degrees, embracing an amplitude from S. S. W. to N. E. From meridian to four, fired two guns to perceive echo. It was believed to be observed at both trials. Current running north by west."

The log of the 15th. "At 1 A.M., fog lifting, made Herald Island. The bay of Middle Point covered with ice, which extended to N. W. by N. Different portions of the island covered with snow and ice. Depth of water at 4 A.M., twenty-four fathoms. Two boats left the ship to land on Herald Island to take observations. No other land in sight. Small floes of ice drifting to the north. The boats returned, bringing specimens of plants and minerals and of birds, which were exceedingly numerous and so tame as to be caught by the hand. At noon Herald Island about three miles distant. No other land in sight from royal yard, with a clear horizon to north and northwest. Latitude observed $71^{\circ} 21' 36''$ N."

The log of the 16th. "Distance from Herald Island, per log, $106\frac{3}{4}$ miles. Ice seen from deck from S. to W. by N., packed, and as far as the eye can reach from the top masthead. At 8.30 tacked ship, a barrier of ice extending from S. to N. W. Sent lookouts aloft; weather clear. Could see a radius of thirty miles; no land in sight except Herald Island."

The log of the 17th. "Latitude $68^{\circ} 45' 20''$. From eight to meridian sounded every hour; twenty-eight fathoms; bottom, soft mud and shells. Found the surface current .584 knot per hour, N. W.; at two fathoms' depth .642 knots per hour; at five fathoms' depth .817 knots per hour, N. W.; at fifteen fathoms' depth .758 knots."

The log of the 18th. "Passed a large log of drift-wood; water whitish-green color. At 6.05 A.M. made the coast of Asia, distance forty miles; high volcanic cone; land in view along the southern board, an elevated promontory, supposed to be Cape North. A large number of birds of different species."

The "Vincennes" now ran for Wrangell Land. On the 19th the weather was foggy, masses of ice floated near, and a wall-like barrier was before the ship. She was within ten miles of the position of Wrangell Land, in the reported Polynia, or open sea, in lat. $70^{\circ} 41'$, lon. $177^{\circ} 21' W.$, when thus arrested. No land could be seen, though it was thought the vision extended six or eight miles in every direction. The Commander "had, with some reluctance, stood for this land, from an unwillingness to take so much time from the peculiar duties of the Expedition; but he had known that no keel had penetrated where he proposed to go, and that a knowledge of the depth, the temperature, and the currents would be of value if land should not be discovered. He had attained the limits which he had proposed for his cruise, and penetrated further than any one in the direction selected." He gave orders to return. Continuous adverse head-winds from the northeast permitted the rounding of East Cape on the 31st only, on which day, with every appearance of a gale, the "Vincennes," making eleven and a half knots, ran into St. Lawrence Bay, after making a survey of which bay, she again headed south on September 3, and on the 5th arrived at Semiavine Straits, where she found the Observing Party left there in August, safe and in good health.

On the day previous, while Lieutenant Brooke, accompanied by several of his party, were in pursuit of a bear, on the Island Thirklook in Glasenapp Harbor, from the height of a spur of the mountain they had been delighted with the sight of a ship at such distance as to appear like a baidar, but with all her sails identifying her as the sloop-of-war. At night he made the usual rocket and other signals. On the 6th two guns were fired to assure Commander Rodgers of the safety of the party; the "Vincennes," rounding the point with her broad pennant flying, answered a salute of thirteen guns from the camping party. Commander Rodgers on landing fulfilled his promise to the Chief, Caroorgar, by a liberal number of presents, including rice, molasses, and bread, and adding others for the villagers. When these had come together, Caroorgar took some of the rice and molasses from each pan, and scattered it to the northeast and southeast; then shading his eyes with his hand, and looking right at the sun, offered a portion to that luminary.

A supply of greens was much needed on board the ship, on which more than twenty men were still on the sick-list with scurvy, but the lateness of the season prevented the gathering of anything, except a small quantity of sorrel. A moderate quantity of venison was obtained.

RETURN TO SAN FRANCISCO.

September 17.—The shore party having returned on board, and the surveys of the harbor being completed, a line of soundings was run at the entrance of the Strait, and its outward passage examined by Lieutenants Brooke and Fillebrown and Mr. Knorr. On the 24th the passage through the Aleutian chain was made by night, through the Straits of Amoukta. This passage was found to be excellent, "the widest and probably the best through these seas." Nothing of special interest occurring on her return, October 13th, the "Vincennes" anchored in the harbor of San Francisco, which she would have more readily made if the Light-house Register had not shown three light-houses as built, and all alike, when one only was there. The "Hancock" and the "Fenimore Cooper" arrived in port the day following.

In communicating to Secretary Dobbin the results of the cruise, the Commander regretted the recurrence of the unfavorable weather which had so frequently prevented the observations of the character he desired. Soon after leaving Hakodadi, in Japan, he had entered into a region of fogs, which extended far into the Arctic Seas. "The general observation of the land and of the heavenly bodies renders surveying results at such times comparatively meagre. The Russians complain that a ship may cruise a whole season without doing valuable work, and the reason is plain; for the currents make it impossible for her to hold for any length of time a position near the land which is invisible; and, when opportunity for observing comes, the laborer finds himself in a place far different from the one he desired. When he regains his position the fog may have hidden everything. A steamer manifestly is the only fit vessel for such seas, but the 'Vincennes' is a sailing-ship."

It was natural that Commander Rodgers should express his sensitiveness on the point of his success in the surveys, which he did by adding to this the words: "We have reason to congratulate ourselves if our

results should prove valuable or satisfactory." Their worth has been already shown; the Admiralty charts acknowledge it.

Closely following this Report to the Secretary, Commander Rodgers forwarded to the Navy Department a series of recommendations submitted by Acting Lieutenant Stevens of the "Hancock" for further surveys in the Pacific. Referring to the Kurile Islands, that officer suggested their thorough examination, the Southern Isles being very incorrectly charted; some of them reported by whalers to be a degree further east than their true positions. The north side of Jesso, or Matsmai, also required survey. If possible, a port should be opened for the whalers, since they pass along its shores, and might receive supplies not available on the Kamtschatka coast, their next stopping-place. Both the approaches to the Amoor River were recommended for examination; and that the river itself be visited, not so much for the value of its channel, so continually changing and unprofitable, as to learn the resources of the country and the wants of the people, with whom a useful commerce might be established. It might become one of the links in our trade with China and Japan: "The fertility of the soil of the Amoor is almost profitless to the Russians through their want of laborers; but every want can be supplied from the United States more readily than from the interior of Russia. And as the country produces nothing to make up a return cargo, the money received for goods from a trader might be laid out with advantage, and in a very short time in purchases in Japan or China." A new survey was recommended for the Ishantee Islands, of which the Russian charts were found insufficient; further examinations also of the Gulfs of Jamsk, Jijiginsk, and the harbor of Bolcharltsk, lat. $52^{\circ} 50' N.$, lon. $156 E.$, near which the right whale is sought. Numerous American vessels annually cruise there.

These suggestions, with others from the officers of the squadron, were made in answer to the very careful instructions given to each by Commander Rodgers, in which he never lost sight of the original purposes of the Expedition,—those of surveys, of inquiries for harbors, for the supplies of the mercantile marine, and especially for the localities in which coal could be found. It would seem that he anticipated at that day the rapid substitution of steam for sail within

the mercantile marine, and to this the experiences of the Expedition must have led the thoughts of his officers.

On the return of the Commander to Washington, arrangements were made for the preparation of a full Report of the Expedition, and it is with a renewed expression of surprise and regret that it is again said here that these arrangements were arrested. As the papers of the officers, except those of the naturalist (most unfortunately destroyed by fire at Chicago), and the paintings and sketches made by the Artists and Draughtsmen are preserved by the Government, and as several of the officers of the Expedition are still available for preparing a full Narrative, may it not be hoped that Congress will make the moderate appropriation needed to enable the Department to place before the Naval and Mercantile Marine, and the Scientific and Literary World, the record of valued labors, made with outlay by the Government. In the Summary of these presented to Congress after the return of the Expedition, it was stated that the "Vincennes," in order to accomplish the survey in the limited period during which the Arctic Sea is open, found it necessary to carry all the sail she could bear, through fog and mist, incurring the danger of wreck on shoals, bergs, and rocks. All that portion which is available for whaling purposes was carefully explored and sounded, while the scurvy had attacked the majority of officers and men. On her return, encountering an obstinate east wind, it was for days doubtful that she could make her escape before the rapidly gathering ice would imprison her,—an event bringing certain destruction. With a reduced complement of officers, the labor of the surveys was performed in addition to the duties of actual sea service in those regions of tempestuous character.

In connection with such a record it would have been gratifying to find in the "Statutes-at-Large" the passage of a Resolution similar to those by which Congress declared its appreciation of like services by other Expeditions. The precedents for such action seem, however, to have been in this case ignored.

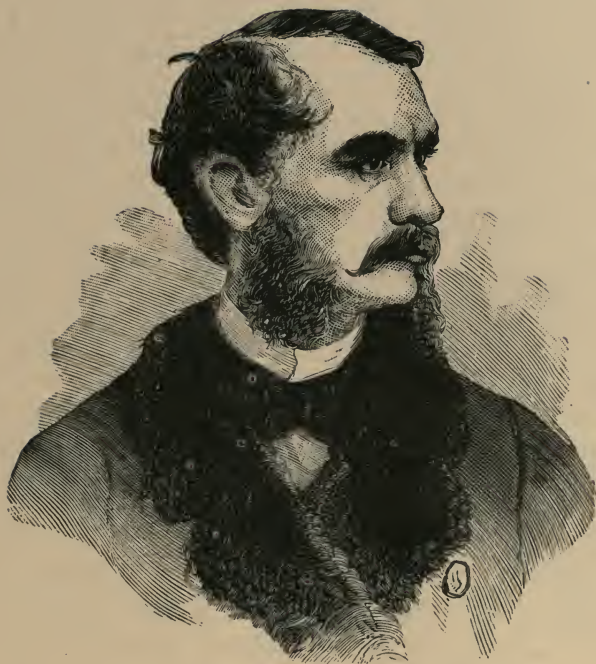
CHAPTER V.

EXPLORATIONS OF DR. ISAAC I. HAYES. (1860-1861.)

DESIGN OF DR. HAYES FOR A NEW EXPLORATION SUGGESTED WHILE ON HIS FIRST VOYAGE WITH KANE. — HIS PLANS SUPPORTED BY THE SMITHSONIAN AND OTHER INSTITUTIONS. — SAILS FROM BOSTON WITH SONNTAG, JULY 7, 1860. — ARRIVES OFF PRÖVEN ON THE TWENTY-FOURTH DAY OUT. — ADDS TO HIS SHIP'S COMPANY AND SUPPLIES AT UPERNAVIK. — CROSSES MELVILLE BAY IN FIFTY-FIVE HOURS TO CAPE YORK. — WINTERS AT PORT FOULKE. — OBSERVATORY SET UP. — OBSERVATIONS MADE. — EXPERIENCES OF THE SEASON. — DEATH OF SONNTAG, HANS' ACCOUNT OF IT. — THE ARCTIC NIGHT DESCRIBED. — ATTEMPTS TO LAUNCH THE BOAT ON THE POLAR SEA. — HIGHEST POINT REACHED. — BELIEF IN THE EXISTENCE OF THE OPEN SEA CONFIRMED. — EXPERIENCES OF RECENT NAVIGATORS COMPARED WITH THIS. — EXPLORATIONS AND SURVEYS MADE ON THE RETURN VOYAGE TO THE UNITED STATES. — PURPOSE OF A NEW EXPEDITION. — RECEPTION OF THE GOLD MEDALS FROM ABROAD. — VOLUMES PUBLISHED.

THE next American Arctic Exploration on the Northeastern coast was effected by Dr. Hayes, surgeon of the second Grinnell Expedition. A new voyage had suggested itself to him during even the severe experiences of his former cruise in the "Advance"; but it did not become practicable until the spring of the year 1860.

His plans included an extensive scheme of discovery. The proposed route was again to be by way of Smith's Sound, and his objects were to complete the survey of the north coasts of Greenland and Grinnell Land, and to make further explorations towards the Pole, in order to verify the existence of the reported open Polar sea, and carry forward investigations in the different branches of scientific inquiry. On the former voyage he had traced Grinnell Land beyond the eightieth parallel, and he now hoped to push a vessel into the ice-belt there, and thence transport a boat over it into the open water of the great basin which he hoped to find beyond.



DR. ISAAC I. HAYES, SURGEON OF THE SECOND GRINNELL EXPEDITION,
COMMANDER OF THE EXPEDITION OF 1860-61.

Author of "The Open Polar Sea," "An Arctic Boat Journey," "The Land of Desolation," etc. Medallist of the Royal Geographical Society of London, and of the *Société de Géographie* of Paris.

The Expedition received the support of the Smithsonian, the U.S. Coast Survey, and the scientific societies of the first rank in the United States; while from abroad came the warmest expressions of regard for its success, communicated by Sir Roderick I. Murchison, President of the Royal Geographical Society, London; with a liberal contribution from the Vice-President of the Société de Géographie of Paris, M. de la Roquette. Through the interest manifested by the friends of the Expedition in New York, Philadelphia, Boston, and Albany, contributions were secured sufficient to equip one vessel;—the original and wise plan of Dr. Hayes to have two, one of them a small steamer, to use her steam-power only in the ice, was found impracticable.

The fore-and-aft schooner "Spring Hill," of one hundred and thirty-three tons, was purchased at Boston, her name being changed to the "United States"; a change legalized by Congress. Mr August Sonntag, who, since his return with Dr. Kane, had been engaged in scientific work in Mexico, declined an appointment as Associate Director of the Dudley Observatory, Albany, to be the astronomer of the Expedition. He was the only educated person on whom Hayes could call on the cruise. The party numbered in all fifteen persons.

From the Smithsonian and the Coast Survey, Hayes had received a fair equipment for scientific investigations, supplemented by additions from Mr. Tagliabue and Mr. Green of New York. The outfit of clothing, provisions, and ammunition was far better than that of Dr. Kane's in 1853.

July 7, 1860, the ship sailed from Boston harbor. Upon her course for the outer Capes of Newfoundland, inside of Sable Island, on the second day out, a dense fog settled down for the anxious term of six days,—at one time the black wall of the breakers closing fast upon her, until the schooner came round to the wind, and a steady helm saved all.

On the 30th, the crossing of the Arctic circle was celebrated by a salute and a display of bunting: the average run of one hundred miles a day had been made for twenty days; at midnight, sunlight still flooded cheerily the cabin of the "United States."

After her first heavy Arctic experience, the loss of all her canvas except the mainsail while passing through Davis Strait, by August 3

she was but forty miles from Pröven, and Hayes indulged the pleasing hope of an early landing ; but the wind suddenly died out, keeping her off the land till the twenty-fourth day of their voyage, when the harbor was entered ; the fog then lifting, Greenland, with its broad valleys, deep ravines, mountains, and frowning black and desolate cliffs, was in full sight, and iceberg after iceberg burst into view like castles in a fairy tale.



BELTED ICEBERG.

As seen by C. F. Hall on his first expedition, 1860. (Harper Brothers.)

"It seemed," says Hayes, "as if we had been drawn by some unseen hand into a land of enchantment ; here was the Valhalla of the sturdy Vikings, here the city of the Sungod Fryer, — Alfheim with its elfin caves, and Glitner more brilliant than the sun, the home of the happy ; and there, piercing the clouds, was Himnborg, the celestial mount." At midnight he wrote in his diary : "The sea is smooth as glass, not a ripple breaks its surface, not a breath of air is stirring. The sun hangs close upon the northern horizon ; the fog has broken up into light clouds ; the icebergs lie thick about us ; the dark headlands stand boldly out against the sky ; and the clouds and bergs and mountains

are bathed in an atmosphere of crimson and gold and purple most singularly beautiful. The air is warm almost as a summer night at home, and yet there are the icebergs and the bleak mountains. The sky is bright, soft, and inspiring as the skies of Italy; the bergs have lost their chilly appearance, and, glittering in the blaze of the brilliant heavens, seem in the distance like masses of burnished metal or solid flame. Nearer at hand they are huge blocks of Parian marble, inlaid



UPERNAVIK.

Visited by the U. S. S. "Juniata," Capt. Braine, July 31, 1873.

with mammoth gems of pearl and gold. The form of one is not unlike that of the Coliseum, and it lies so far away that half its height is buried beneath the blood-red waters. The sun, slowly rolling along the horizon, passed behind it, and it seemed as if the old Roman ruin had suddenly taken fire." In the enjoyment of such views the explorers buried their temporary disappointment at not landing on the new lands; the twenty-fourth day brought them into Pröven.

At Upernavik the ship's company was increased by the addition of six persons: Jensen, a Dane who had lived ten years in Greenland, enlisting as an interpreter, three natives as hunters and dog-drivers,

and two Danes as sailors. Letters being committed to the care of Dr. Rudolph, the retiring chief trader, who was about to return to Denmark, and would transmit them to the United States through the American Consul at Copenhagen, the ship again left the coast, heading north.

Tessi-ussak — "*the place where there is a bay*" — was reached on the 21st, where, as at the places previously visited, the Danish officers extended every facility in their power to the ship's company. Arctic clothing and dog-teams were furnished, the number of the teams being, however, small, in consequence of a recent prevalent disease among the dogs.

On the 23d, Melville Bay was entered in a thick snow-storm, but the crossing was effected without encountering much ice; — a confirmation of the remarkable diversity of experience in this water so often adverted to by Arctic explorers.* The passage to Cape York was made in fifty-five hours. When nearing the Cape, and keeping a lookout for the appearance of natives, very soon some were seen running down to the sea, among whom was Hans Hendrick, who promptly recognized his old companions, Hayes and Sonntag, and desired to join them. With his wife and babe he was taken on board; but to prepare the new party for the wearing of the dress of civilization, the sailors soon set upon them with the use of tubs of warm water, soap, scissors, and the comb.

* "The whalers have long called by the name of Melville Bay the expansion of Baffin Bay which begins at the south with the "middle ice," and terminates at the north with the "North Water." The North Water is sometimes reached near Cape York, in latitude 76°, but more frequently higher up, and the middle ice, which is more generally known as the "pack," sometimes extends to the Arctic Circle. The pack is made up of drifting ice-floes, varying in extent from feet to miles, and in thickness from inches to fathoms. These passes are sometimes pressed closely together, and having but little or no open space between them, and sometimes they are very widely separated, depending upon wind and time. The penetration of this barrier is usually an undertaking of weeks or months, and is ordinarily attended with much risk.

The "Fox," under the command of Captain F. L. McClintock, R.N., was caught in the pack on the 18th of August, 1857, in latitude 75° 17' N., longitude 62° 16' W., and was not liberated until the 25th April, 1858, an interval of two hundred and fifty days, during which period the vessel drifted to latitude 63° 47' N., longitude 56° 36' W., 1,194 geographical miles to the southward, — perhaps the longest drift recorded up to date. [The drift of the floe party of the U.S.S. "Polaris" under Tyson was from latitude 77° 35' N., to latitude 53° 30' N., — a distance of over 1,200 miles in 190 days.]

The coast-line now presented the reappearance of the trap formation of the island of Disco, and showed a lofty ragged front, broken by deep gorges of picturesque view, numerous streams of ice bursting through them. At Cape Athol, on the southern side of Wostenholme Sound, the igneous rocks give place to lines of calcareous sandstone and greenstone.

August 26, the ship reached a point a little to the north of the position of the old seaman, Baffin, in 1616, and of Captain Ross, R.N., in 1818, twenty miles south of Cape Alexander, the entering Cape of Smith's Sound. At the mouth of this strait an ice-pack forbade entrance, a second attempt being entirely frustrated by a gale which drove the ship off. A lodgment was secured only at the close of the sixth day. It was, however, a disappointment of the most serious character to Hayes to find that he could not hope to cross the Sound, for he had expected from the first, as has been shown, to make a more successful advance from the western side than Kane had been able to effect from Rensselaer Bay. In a little harbor of Hartstene Bay, latitude $78^{\circ} 17' 41''$ N., longitude $72^{\circ} 30' 57''$ W., ten miles northeast of Cape Alexander, and twenty south of Kane's harbor in 1854-55, winter quarters were of necessity prepared. The position was named Port Foulke, but from Foulke Fiord the chances of a successful advance in the succeeding spring were much diminished.

The preparations for the coming season were much the same as those made by Dr. Kane, and, indeed, by all Arctic vessels, and need not be repeated here. A house was built on shore for stores, and an Observatory erected, furnished with a pendulum apparatus, the beats of which numbered 3,607 in 3,600 seconds of time.

On removing the pendulum, October 12, 1860, a unifilar magnetometer was mounted, the scale readings of which were recorded every seventh day hourly, and three times daily during the interval from November to the month of March, 1861. Four classes of magnetic observations — for declination, deflection, vibration, and dip — were made; the series of all the observations, including those of a later date, being, after the return of the Expedition, reduced and discussed by Mr. C. A. Schott of the U.S. Coast Survey, and published as Volume XV. of the "Contributions" of the Smithsonian Institution.

The thermometrical observations of the series show very interesting points of the temperatures of the regions visited at that season. The weather was unlike that experienced by Kane; northeast winds frequently were very strong, and kept the water constantly open outside of the harbor. The lowest temperature registered at Port Foulke was, however, only -29° , while at Rensselaer Harbor, only twenty miles further north, on the same day with this record, Dr. Hayes, on a visit there, registered -68° F.

A visit to "Brother John's Glacier"—the one referred to in the explorations of Dr. Kane, and so called by him after his brother, Dr. J. P. Kane—was made in the Autumn by Hayes, in company with Mr. Sonntag; a survey of this, renewed after a lapse of eight months, showed a downward movement of the glacier of ninety-four feet. A journey upon it, and upon the *Mer de Glace* to the eastward, carried the explorers about fifty miles inland, revealing a surface at first broken and irregular, but, as the party advanced, smooth and with a regular ascent. Their angle of ascent in travelling was at the outset six degrees, decreasing gradually to two. The elevation reached was about five thousand feet; but with the winter had come the usual and very serious misfortune of the loss of the teams, on which any exploration depended for success.

THE DEATH OF MR. SONNTAG.

Far more distressing than this was the death of Mr. Sonntag, who perished in the ice on his way with Hans to visit the Eskimos at or near Whale Sound, in order to purchase dogs or to bring the natives to the ship, where, for the service of their teams, they could be fed, and the prospective wants of the ship's company be also looked after.

December 22, as there was, in Hans' opinion, a probability that the Eskimos would be congregating about Cape York, and that some of them might be at Sorfalik, or at other stations on the north side of Whale Sound, the two travellers were on their way, hoping that they would find natives without going as far as Northumberland Island, but prepared, as they supposed, to go even that far. Their provisions were made up but for twelve days, and they took no tent, intending to

rely on the snow-hut, with the construction of which Hans and Sonntag were both familiar. The latter had his sleeping-bag, and was in high spirits at the prospect of a few days' adventure.

The night following, Hayes, whether from a natural anxiety for their safety, or from this in connection with the small prospect now left of success if they should return without assistance from the natives, had a singular and foreboding dream, which may be placed to the account of like coincidences so frequently arising out of the consciousness of uncertainty in times of serious solicitude, but without the possibility of one's being able to account for the foreshadowings which they prove to have been. He thought he stood far out on the frozen sea with Sonntag, when suddenly there came a crash, and a crack opening between them, Sonntag sailed away upon the rough waters. He last saw him, as he thought, sharply outlined against a streak of light on the distant horizon; but he was gone.

On the last day of the month Hans came in, but accompanied only by his wife's brother, who had assisted him on the journey. His sad story to the doctor soon told all. They had rounded Cape Alexander, and, without halting, had reached Sunderland Island, made their own snow-hut at Sorfalik, and proceeded on their way to Northumberland Island; but there the Astronomer, growing a little chilled, sprang off the sledge, and ran ahead to warm himself by exercise, when suddenly Hans saw him sinking through the thin ice upon which he had come, which covered a recently opened tide-track. He drew him out, but the chill was too severe for Mr. Sonntag's life.

In the "Memoirs of Hans Hendrik, translated from the Eskimo by Dr. Rink, Director of the Greenland Board of Trade," Hans gives his own more full account of this calamity:—

"In winter, just before Christmas, the Astronomer and I undertook a Journey by sledge to look for natives. We crossed [passed by?] the great glacier, and travelled the whole day [of course only twilight, there being continual night] without meeting with any people. A strong wind sprang up from the north, and caused a thick drifting of snow, while we made our snow-hut and went to sleep. On waking the next day, it still blew a gale and the snow drifting dreadfully, for

which reason we resolved to return. While we proceeded homewards the ice began breaking up; so we were forced to go ashore and continue our drive over the beach-ice [ice-foot]. We arrived at a small firth and crossed it, but, on trying to proceed by land on the other side, it proved impassable, and we were obliged to return to the ice again. On descending here my companion fell through the ice, which was nothing but a thick sheet of snow and water. I stooped, but was unable to seize him, it being very low tide. As a last resort, I remembered a strap hanging on the sledge-poles; this I threw to him, and when he had tied it around his body I pulled, but found it very difficult. At length I succeeded in pulling him up, but he was at the point of freezing to death; and now in the storm and drifting snow he took off his clothes and slipped into the sleeping-bag, whereupon I placed him upon the sledge, and repaired to our last resting-place.

"Our road being very rough, I cried from despair for want of help; but I reached the snow-hut, and brought him inside. I was, however, unable to kindle a fire, and was myself overpowered with cold. My companion grew still worse, although placed in the bearskin bag, but with nothing else than his shirt. By-and-by his breathing grew scarcer, and I too began to feel extremely cold, on account of now standing still, after having perspired with exertion. During the whole night my friend still breathed, but he drew his breath at long intervals, and towards morning only very rarely." . . .

After detailing his own severe sufferings, and his return to the brig, and the assistance given him on the way by some friends and relatives, Hans continues:—

"On my arrival I found my dear wife tolerably well; but I could not be happy, since I left that friend of mine who had loved me so kindly, and who also, some winters before, when we spent three years together, had treated me with such goodness. Our Commander Ese, [Hayes] was gladdened by my arrival, as he had believed me to be lost. He inquired where I had left my friend. I replied, 'On leaving him I covered him entirely with snow; now I will soon go to fetch his corpse.' But he said, 'When the days grow longer thou may'st go for it; but now first try to get some reindeer; we are longing for reindeer meat.'

"I then remained several days to await a brighter season. The first day I went out shooting I got a large rein-buck. Afterwards I hunted every day, sometimes bringing home two deer, sometimes three. At last, when bright sunshine had begun, a sledge arrived, which was engaged to accompany me. We also got the ship's mate for our companion. When we arrived we dug among the snow, and brought forth the dead man, still enveloped in his bag. I feared the foxes might have eaten the body, but even the bag was quite untouched. We deposited him in my sledge, the mate followed with my comrade, and we came back to the ship in the evening. They brought the corpse into the Captain's cabin for him to thaw. The next day, when I saw our Commander, he said, 'I thank thee for thy having taken care of him.' " *

The simplicity of the narrative of Hans, shown throughout his whole story of the four Expeditions in which he was engaged, seems fully to justify the conclusions at which Dr. Hayes, after much anxiety, arrived, as to the fidelity of the native in this matter. At first there seemed ground for the suspicion that the object of the proposition when it came from Hans, to visit the Cape, was in reality to visit his relatives there, and bring them up to be near him; for now three of them were on board ship. Nor was it at all satisfactory to have had no

* Captain Nares says of Hans, when employed by him, "He proved to be an admirable hunter and an excellent dog-driver. When a lad of nineteen years (in 1853) he joined Dr. Kane's expedition. After rendering invaluable services to his companions during their two winters' stay at Rensselaer Harbor, Smith Sound, he married Merkat, the daughter of Shanghu, one of the 'Arctic Highlanders,' who tended him while lying sick at Hartstene Bay. He remained behind with his wife when Dr. Kane abandoned his vessel and travelled south to Upernavik in boats.

"In 1860, after he had passed five years with the 'Arctic Highlanders,' Dr. Hayes, finding Hans at Cape York, took him and wife and child on board his vessel, the 'United States.' On the homeward voyage, in 1861, he was landed, with his belongings, at Upernavik. In 1871 he joined Captain Hall, in the 'Polaris,' taking his wife and three children with him. He was one of the party who was separated from the 'Polaris' in a gale of wind, and drifted during the long winter of 1872-73 from Smith Sound to the southward of Hudson's Straits. During this time he and Joe—another Eskimo—preserved the lives of their companions by their indefatigable and noble exertions in hunting and procuring seals."

"Hans' Memoirs," translated by Dr. Rink, and edited by Dr. Stevens, is a curious production, interesting by its simple native expressions, some of which could not bear precise translation. The visit to New York and Washington will amuse the reader.

message from the Astronomer, or to think that he would have travelled five miles in wet clothing, especially as he was accompanied by one who was familiar with provision for such necessities, and who could have made him immediately comfortable in the sleeping-bag until he had dried the clothing. Yet, as Hans constantly repeated identically the same story in a straightforward way, and as it was at all times for his own interest to be faithful to the one who, of all on the ship, was his best friend, Dr. Hayes settled into the assurance that it was a true account which had been given, and that it would be unreasonable, as well as unjust, to suspect Hans of desertion.

In the middle of the month following, when the season permitted it, the body was recovered by the assistance of Mate Henry Dodge of the ship, who went down to Sorfalik with two dog-teams, one driven by Hans and one by a native who had come into the ship. Hans without difficulty recognized the locality by a rock near by, but the remains were disinterred with extreme labor, the winds having piled up the snow to the complete burial of the hut. The thermometer stood at forty degrees below zero.

Mr. Sonntag's body was placed in the Observatory, "where his fine mind had been intent, a few weeks before, on pursuits the delight of his life," until a grave was dug in the frozen terrace; then the burial service was read, and afterward a neat mound raised, with a chiselled inscription:—

AUGUST SONNTAG.
DIED, DECEMBER 28, 1860,
Aged 28 years.

A cross surmounted the monument.*

The experience of the weary Arctic night of months, in place of the days which the inhabitant of happier climes enjoys, has been spread

* In the vestibule of the Dudley Observatory, Albany, hangs a portrait of the young astronomer. Under it are the sad words, "Perished in the ice at Port Foulke, latitude 78° 17' 14" N., December 28, 1860." On the faded United States flag draped above the young man's head are the words, "From his class in Albany Female Academy, June, 1860." May 7, 1873, Dr. Emil Bessels and Mr. R. W. D. Bryan, of the U. S. S. "Polaris," when visiting Port Foulke, found the Astronomer's grave despoiled by the Eskimos, for the sake of the wood of his coffin. The travellers replaced the remains, refilled the grave, and reset the headstone.

Foulke Fjord, visited by Dr. E. Bessels and Mr. W. D. Bryan, of the "Polaris," May 7, 1873.



upon the records of all Arctic explorers; and the wonderful power of partial adaptation in man to the strange circumstances in which he finds himself when in the new regions of darkness — the peculiar sentiments which such changed relations inspire — are most forcibly and happily expressed in the volume from which most of the preceding narrative is drawn. A citation from Hayes' Journal will be appreciated: "January 16, 1861. Our eyes now turn wistfully to the South, eagerly watching for the tip of Aurora's chariot, as the fair goddess of the morning rises from the sea to drop a ray of gladness from her rosy fingers into this long-neglected world. It is almost a month since we passed the darkest day of winter, and it will be a long time yet before we have light; but it is time for us now to have at noontime a faint flush upon the horizon. A faint twilight flush mounting the southern sky to-day at the meridian hour, though barely perceptible, was a cheering sight to all. We feel that the veil of night is lifting, that the cloud is passing away, that the load of darkness is being lightened. . . .

"The people have exhausted their means of amusement; we long for the day and for work. Talk as you will of pluck and of manly amusement, this Arctic night is a severe ordeal. It is a severe trial to the moral and the intellectual faculties. The cheering influences of the rising sun, which invite to labor; the soothing influences of the evening twilight, which invite to repose; the change from day to night and from night to day, which lightens the burden to the weary mind and the aching body, is withdrawn; and, in the constant longing for light, light, the mind and body, weary with the changeless progress of the time, fail to find repose where all is rest. The grandeur of Nature ceases to give delight to the dull sympathies; the heart longs for new associations, new objects, and new companionships; the dark and dreary solitude oppresses the understanding; the desolation which reigns everywhere haunts the imagination; the silence — dark, dreary, and profound — becomes a terror. I have gone out into the Arctic night, and viewed Nature in her varied aspects. I have rejoiced with her in her strength, and communed with her in repose. I have walked abroad in the darkness, when the winds were roaring through the hills and crashing over the plains. I have wandered far out in upon the

frozen sea, and listened to the voice of the icebergs, bewailing their imprisonment; along the glacier, where forms and falls the avalanche; up on the hill-top, where the drifting snow, coursing its way over the rocks, sang its plaintive song; and again I have wandered away to the distant valley, where all these sounds were hushed, and the air was still and solemn as the tomb.

“And here it is that the true spirit of the Arctic night is revealed, where its wonders are unloosed, to sport and play with the mind’s vain imaginings. The heavens above and the earth beneath reveal only an endless and fathomless quiet; there is nowhere evidence of life or motion; I stand alone amidst the mighty hills; their tall crests climb upward, and are lost in the gray vault of the skies, their dark cliffs, standing against their slopes of white, are the steps of a vast amphitheatre. The mind, finding no rest on their bald summits, wanders into space; the moon, weary with long vigil, sinks to her repose; the Pleiades no longer breathe their sweet influences; Cassiopeia and Andromeda and Orion, and all the infinite host of the unnumbered constellations, fail to infuse one spark of joy into this dead atmosphere; they have lost all their tenderness, and are cold and pulseless. The eye leaves them and returns to earth, and the trembling ear awaits something that will break the oppressive stillness. But no footfall of living thing reaches it, no wild beast howls through the solitude. There is no cry of bird to enliven the scene; no tree among whose branches the winds can sigh and moan. The pulsations of my own heart are alone heard in the great void; and, as the blood courses through the sensitive organization of the ear, I am oppressed as with discordant sounds. Silence has ceased to be negative; it has become endowed with positive attributes. I seem to hear and see and feel it. It stands forth as a frightful spectre, filling the mind with the overpowering consciousness of universal death,—proclaiming the end of all things and heralding the everlasting future. Its presence is unendurable. I spring from the rock upon which I have been seated; I plant my feet heavily in the snow, to banish its awful presence, and the sound rolls through the night and drives away the phantom.

“I have seen no expression on the face of Nature so filled with terror as THE SILENCE OF THE ARCTIC NIGHT.”



THE BEST PART OF A SLEDGE JOURNEY.

From Hall's First Expedition. (Harper Brothers.)

In the early Spring the Eskimos replenished the dog-teams to the number of twenty. Several, however, died as before. With the rest a provision depot for the Summer use was soon established, and on the 4th of April, 1861, Hayes, with twelve officers and men, started out on his principal and long and still-cherished journey to the North. His equipment consisted of a metallic life-boat, mounted on runners, with provisions for seven persons for five months, and for six persons and fourteen dogs for six weeks. He was, however, again compelled to keep to the eastern shore, and, consequently, encountered the same experience of ice-hummocks with which Kane had met; and finally finding it impossible to transport the boat brought out in the fond anticipation of pushing it out on the Polar waters, he sent it back with the main party, while he continued the journey with two companions only. But with these he reached the west coast by nearly the same track followed by him in 1854, corrected some errors of the chart made at that time, entered Kennedy Channel, and on the 16th of the month attained a point forty miles further north than Kane's highest on the opposite shore. Returning in the same track, he reached his vessel after an absence of fifty-nine days, and a journey of comings and goings of fourteen hundred miles. To the highest point reached he gave the name of Cape Lieber. To the north lay the excellent bay named Lady Franklin Bay. In the far distance, north of Cape Beechey, a headland was seen, to which he gave the name of Cape Union.

On Cape Lieber, latitude $81^{\circ} 35' N.$, longitude $70^{\circ} 30' W.$, May 18, 1861, he unfurled the United States boat's ensign which had been carried in the Antarctic Expedition of Wilkes, and in those of De Haven and Kane, with several other flags intrusted to him by Masonic lodges in New York and Boston, and one presented to the lamented Mr. Sonntag by the ladies of the Albany Acad my, being "under obligation to unfurl all these at the most northern point attained." His record of the visit, recounting his journey of forty-six days from Port Foulke, with his companion, Mr. Knorr, was deposited within a glass vial beneath a cairn.

The stay in Kennedy Channel was from the 12th to the 23d of May, a period of the year six weeks earlier than the time when Morton

reported to Kane an open sea in this channel and north of it. Dr. Hayes did not find open water, but much decayed and thin ice, and in some places pools of water; in one, a flock of waterfowl,—the *Uria Gryllae*, Dovekies. He observed some indications of “the region to the northward being annually opened.” The coast on the west side of Kennedy Channel, especially where exposed to the northeast, was lined with a heavy ridge of ice, which had been forced up under the influence of great pressure. Many of the masses were as much as sixty



“UNFURLING THE FLAGS.”

feet in height, and they were lying high and dry upon the beach. The pressure necessary to occasion this result could not possibly be created, he thought, by ice-fields moving over a narrow channel, and he believed the result to have been produced by ice-fields of great extent coming down under the influence of winds and the current from a vast open area to the northward. As during his voyage with Kane, and afterward upon this exploration, as well as through the rest of his life, he remained the steadfast advocate of the existence of “this Open Polar Sea,” entitling thus the volume in which he gave to the world the account of this voyage of 1860; frequently, also, by lectures and

through the press, upholding the theory, it will not be out of place to accredit him more fully with his arguments in his own language. His sincere convictions will be compared by the reader with the experiences and views of later explorers, especially those of Hall and Budington, of the "Polaris," and of Captain Nares, of the English Expedition of 1875, to which a fuller reference is invited.

In Chap. XXXII. of the volume just cited, after referring the reader to the three breaks in the long line of Northern coast through which the waters of the Atlantic and Pacific Oceans enter the Northern basin, Dr. Hayes says: "If one traces the currents on the map, and follows the Gulf Stream as it flows northward, pouring the warm waters of the Tropic Zone through the broad gateway east of Spitzbergen, and forcing out a return current of cold waters to the west of Spitzbergen and through Davis Strait, he will very readily comprehend why, in this incessant displacement of the waters of the Pole by the waters of the Equator, the great body of the former is never chilled to within several degrees of the freezing point; and since it is probably as deep, as it is almost as broad, as the Atlantic between Europe and America, he will be prepared to understand that this vast body of water tempers the whole region with a warmth above that which is otherwise natural to it; and that the Almighty hand, in the all-wise dispensation of His power, has thus placed a bar to its congelation: and he will read in this another symbol of Nature's great law of circulation, which, giving water to the parched earth and moisture to the air, moderates as well the temperature of the Zones—cooling the Tropic with a current of water from the Frigid, and warming the Frigid with a current from the Tropic."

"Bearing these facts in mind, the reader will perceive that it is the surface water only which ever reaches so low a temperature that it is changed to ice; and he will also perceive that when the wind moves the surface water, the particles which have become chilled by contact with the air mingle in the rolling waves with the warm waters beneath, and hence that ice can only form in sheltered places, or where the water of some bay is so shoal, and the current so slack, that it becomes chilled to the very bottom, or where the air over the sea is uniformly

calm. He will remember, however, that the winds blow as fiercely over the Polar Sea as in any other quarter of the world; and he will, therefore, have no difficulty in comprehending that the Polar ice covers but a small part of the Polar water; and that it exists only where it is nursed and protected by the land. It clings to the coasts of Siberia, and springing thence across Behring Strait to America, it hugs the American shore, fills the narrow channels which drain the Polar waters into Baffin Bay through the Parry Archipelago; crosses thence to Greenland, from Greenland to Spitzbergen, and from Spitzbergen to Nova Zembla,—thus investing the Pole in an uninterrupted land-clinging belt of ice, more or less broken, as well in Winter as in Summer, and the fragments ever moving to and fro, though never widely separating, forming a barrier against which all the arts and energies of man have not hitherto prevailed.' . . .

“With the warm flood of the Gulf Stream pouring northward, and keeping the waters of the Polar Sea at a temperature above the freezing point, while the winds, blowing as constantly under the Arctic as under the Tropic sky, and the ceaseless currents of the sea and the tide-flow of the surface keep the waters ever in movement, it is not possible that even any considerable portion of this extensive sea can be frozen over. At no point within the Arctic Circle has there been found an ice-belt extending, either in Winter or in Summer, more than from fifty to a hundred miles from land. And even in the narrow channels separating the islands of the Parry Archipelago, in Baffin Bay in the North Water, and the mouth of Smith Sound,—everywhere within the broad area of the Frigid Zone, the waters will not freeze except when sheltered by the land, or when an ice-pack, accumulated by a long continuance of winds from one quarter, affords the same protection. That the sea does not close except when at rest, I had abundant reason to know during the late winter; for at all times, even when the temperature of the air was below the freezing point of mercury, I could hear from the deck of the schooner the roar of the beating waves.”

Influenced chiefly by such indications as these, additionally to his strong confidence in the extent of the open water reported by

Morton, and by the observations made by more than one Explorer of the migrations of animal life Northward, Dr. Hayes felt himself justified in affirming that an open sea exists, and that both it and the North Pole may be reached with steam vessels by pushing through the ice-belt, either through Smith's Sound, or by a route west and north of Spitzbergen. In this conviction, he entertained, after his return, the hope of going back in the early part of the following Spring, and reaching the Open Sea, if not in one season, in the next. His plans for this, however, were suspended instantly on his landing at Boston, by the news of the existing conflict against the Government, to which he immediately offered his services and his ship.

It will not be out of place here, while according the highest estimate of Dr. Hayes' ability and of his reasonings and convictions, to bring beside this much-discussed question of the Open Sea, the consideration which it has received by two of the later explorers, Nares and Koldwey. The experience of the "Polaris," under Captain Hall, will be stated in the notice of that American Exploration.

In the Introduction to the "Narrative of the English Expedition of 1875," under Captain Nares, Captain Richards, Hydrographer to the Admiralty, says: "The latter-day theory of an open Polar Sea rests on no foundation, practical or philosophical. Even if it could be shown that a somewhat higher mean temperature is theoretically due in that area where the sun is for six consecutive months above the horizon, and for a similar period below it, this would avail nothing; for the dissolution of the Winter's ice is not dependent on the influence of the Summer's heat alone; otherwise the difficulties of Arctic navigation would disappear, at any rate for some short period, during every season.

"A variety of other elements are equally as important. Chief among them is the action of the winds and tides to break up the decaying floes, but paramount above all others is the necessity for sufficient outlets for the escape of the ice so broken up throughout the vast area of the Polar basin. These outlets we know do not exist; an insignificant point of land, moreover, will act as a wedge, or the prevalence of an unfavorable wind for a few days at the critical period will suffice to decide the question whether such inlets, so important as

Wellington Channel or Smith Sound, will be closed or open during a season. From a ship's masthead or a mountain-summit the visible horizon is limited by the curvature of the earth, and those who have navigated in these regions will well remember how one short hour has carried them from an apparently open sea to a dead-lock, with no streak of water in sight. Water-skies are delusive; an insignificant crack or lane in the ice will produce them, and the only admissible evidence of a Polynia or navigable Polar basin must be the fact that a ship has sailed through it."

Such a voyage may now be assumed as impracticable, and, in regard to a lengthened journey over the Polar pack ice with a sledge party equipped with a boat fit for navigable purposes, this also is affirmed by Captain Nares on the experience of Markham, Parry, and Weyprecht to be equally impossible at any season of the year.

There may be further cited at this point, in relation to the problem of the "Open Sea," the suggestion of Captain Nares, recorded in his Journal of June 22, 1876: "It would appear that the sun, unassisted by other causes, is, after a cold winter, not sufficiently powerful to produce a thaw on a snow-clad ground until it attains an altitude of about 30°; if this is the case, then at the North Pole it is doubtful whether the snow ever becomes melted;" and further, the opinions of Captain Feilden, the naturalist of the Expedition, and his comrades, that animal and vegetable life "specifically and numerically must rapidly decrease with every degree of northern latitude after passing the eighty-second parallel." Captain Feilden adds: "If, however, there be an extension of land to the northernmost part of our globe, I see no reason why a few species of birds should not resort there to breed. There would still be sufficient summer, if such a term may be used, for the period of incubation; and from what I have seen of the transporting powers of the wind in drifting seeds over the frozen expanse of the Polar Sea, I cannot doubt that a scanty flora exists at the Pole itself, if there be any land there, and that the abundance of insect-life which exists as high as the eighty-third degree will be present at the ninetieth, sufficient to provide for a few knots, sanderlings, and turn stones." To this may be added the remark of Captain Koldwey, of

the North German Arctic Expedition of 1869-70, that "the existence of an open sea is founded on appearances which prove nothing more than the fact of a patch of open water."

DR. HAYES ON THE GLACIER SYSTEM OF GREENLAND.

In Chapter XI. of his volume, "The Open Polar Sea," Dr. Hayes, after detailing the incidents of his visit to "My Brother John's Glacier," in Chester Valley (discovered by Dr. Kane, in 1855, and so named by him from the name of his brother, the assistant-surgeon of Hartstene's expedition), enters into a general discussion of the Glacier System of Greenland. He prefaces the discussion by the statement that his journey had been the first successful attempt till then made to penetrate into the interior over the *Mër de Glace*, the vastness of which impressed him still more than on a previous visit. He then says: "Greenland may indeed be regarded as a vast *reservoir of ice*. Upon the slopes of its lofty hills, the downy snowflake has become the hardened crystal; and, increasing little by little from year to year and from century to century, a broad cloak of frozen vapor has at length completely overspread the land, and along its wide border there pour a thousand crystal streams into the sea. [Confirmed by Nordenskiöld in 1883.]

"The manner of the glacier growth, beginning in some remote epoch, when Greenland, nursed in warmth and sunshine, was clothed with vegetation, is a subject of much interest to the student of physical geography. The explanation of the phenomena is, however, greatly simplified by the knowledge which various explorers have contributed from the Alps,—a quarter having all the value of the Greenland mountains, as illustrating the laws which govern the formation and movements of mountain-ice, and which possesses the important advantage of greater accessibility. . . . It was easy to perceive in the grand old bed of ice over which I had travelled, those same physical markings which had arrested the attention of Agassiz and Forbes and Tyndall, and it was a satisfaction to have confirmed by actual experiment in the field the reflections of the study—to be able to make a comparison between the Alpine and the Greenland ice."

In drawing out this comparison, Dr. Hayes cites the opinions of M. Le Chanoine Rendu, Bishop of Annecy, whose lifetime had been spent among the rugged crags and ice-cliffs of the Alpine mountains, and the results of whose investigations are to be found in the Memoirs of the Royal Academy of Sciences of Savoy. The Abbé, in his essay, "comes to the very rational conclusion" that the glacier and the river are in effect the same; that between them there is a resemblance so complete that it is impossible to find in the latter a circumstance which does not exist in the former; and as the river drains the *waters* which fall upon the hillsides to the ocean, so the glacier drains the *ice* which forms from the snows on the mountain-sides down to the same level. And he closes his argument with declaring the law:—

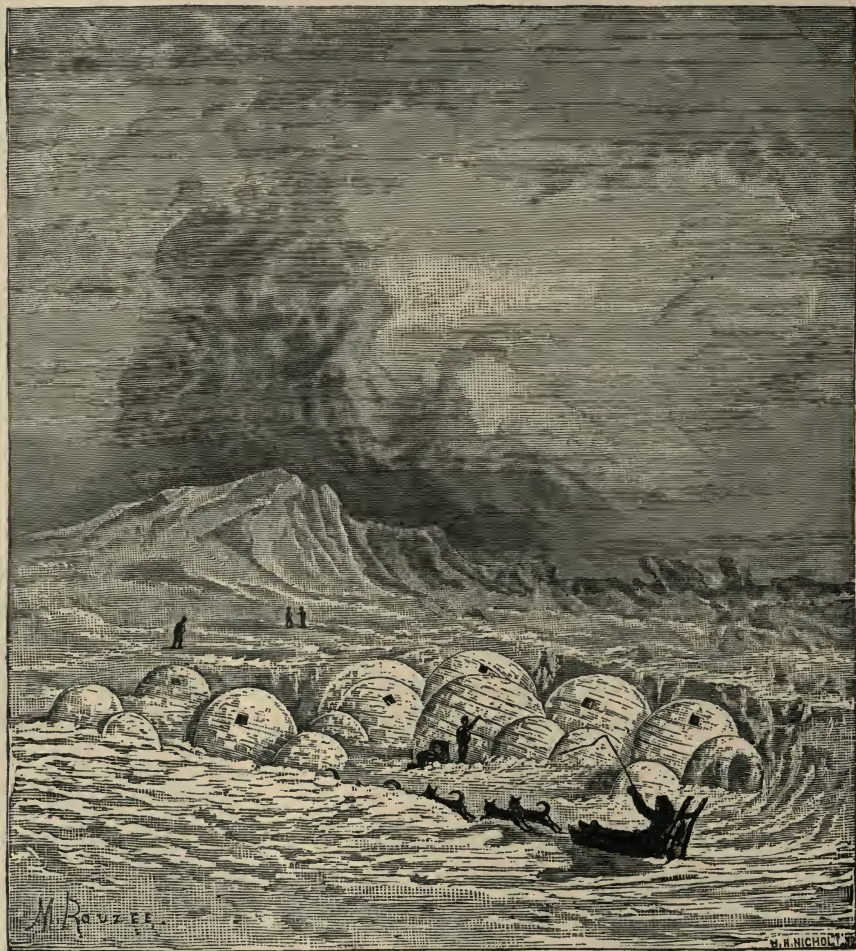
"The conserving will of the Creator has employed for the permanence of His work the great law of circulation, which, strictly examined, is found to reproduce itself in all parts of Nature." To which citations Dr. Hayes adds: "A glacier is, in effect, but a flowing stream of frozen water; and the *river systems* of the Temperate and Equatorial Zones become the glacier systems of the Arctic and the Antarctic. The iceberg is the discharge of the Arctic river, the Arctic river is the glacier, and the glacier is the accumulation of the frozen vapors of the air. Moving on its slow and steady course from the distant hills, at length it reaches the sea, which tears from the slothful stream a monstrous fragment, taking back to itself its own again. Freed from the shackles which it has borne in silence through unnumbered centuries, this new-born child of the ocean rushes with a wild bound into the arms of the parent water, where it is caressed by the surf and nursed into life again; and the crystal drops receive their long-lost freedom, and fly away on the laughing waves to catch once more the sunbeam, and to run again their course through the long cycle of the ages."

And this *iceberg* has more significance than the great flood which the glacier's southern sister—the broad Amazon—pours into the ocean from the slopes of the Andes and the mountains of Brazil. Solemn, stately, and erect, in tempest and in calm it rides the deep. The restless waves resound through the broken archways and thunder

against its adamantine walls. Clouds, impenetrable as those which shielded the graceful form of Arethusa, clothe it in the morning; under the bright blaze of the noonday sun it is armored in glittering silver; it robes itself in the gorgeous colors of evening; and in the silent night the heavenly orbs are mirrored in its glassy surface. Drifting snows whirl over it in the winter, and the sea-gulls swarm around it in the summer. The last rays of departing day linger upon its lofty spires; and when the long darkness is past, it catches the first gleam of the returning light, and its gilded dome heralds the coming morn. The elements combine to render tribute to its matchless beauty. Its loud voice is wafted to the shore, and the earth rolls it from crag to crag among the echoing hills. The sun steals through the veils of radiant fountains which flutter over it in the summer winds, and the rainbow on its pallid cheek betrays the warm kiss. The air crowns it with wreaths of soft vapor, and the waters around it take the hues of the emerald and the sapphire. In fulfilment of its destiny it moves steadily onward in its blue pathway, through the varying seasons and under the changeful skies. Slowly, as in ages long gone by, it arose from the broad waters, so does it sink back into them. It is indeed a noble symbol of the law,—a monument of Time's slow changes, more ancient than the Egyptian pyramids or the obelisk of Heliopolis. Its crystals were dewdrops and snowflakes long before the human race was born in Eden.

To return from this digression: "The Summer of 1861 was passed by Dr. Hayes in the conduct of explorations and surveys in the immediate vicinity of Port Foulke, Hartstene Bay, spoken of recently by Nares as the best winter station on the north coast of Greenland. The established routine of observations was continued at the vessel, and, in addition, a delicate tidal apparatus was constructed, the readings of which were made to tenths of a foot, and at intervals of ten minutes. Hayes was joined by a tribe of Eskimos, living on the coast between Smith Strait and Cape York, and several members of the tribe continued with him until late in the summer. This singular people numbered about eighty souls. They lived in snow-houses

about the harbor, and maintained themselves by hunting the walrus and the seal. The chief of this Etah tribe was again friendly.



A SNOW VILLAGE.

HAYES' RETURN TO THE UNITED STATES.

The schooner, having been prepared for sea, was broken out of the ice on the 10th of July, and sailed from her winter harbor on the 14th. After much difficulty and two trials, she reached the west coast, ten miles below Cape Isabella. That cape she was unable to pass, but

Hayes succeeded in making its north side in a whale-boat, and from an elevation of about six hundred feet, obtained a view to the Northward. In that direction the ice was everywhere unbroken; and as it did not appear probable that he could obtain for the schooner a more northern harbor, and as he had now only five dogs remaining, without means of obtaining a new supply, he decided to abandon the field, and to return home, trusting, as has been intimated, to be able at an early day to renew the attempt with a small steamer.

Entering Whale Sound, he had an excellent opportunity for delineating the shore-line of that remarkable inlet. Through a clear atmosphere he could trace the land around from the North to the South shore, thus proving the inlet to be a deep gulf, which, out of respect to the enterprising navigator who first penetrated its waters, he designated as the Gulf of Captain Inglefield. For two prominent points on the northern side of the gulf, mistaken by Inglefield for islands, Dr. Hayes retained the names which he had used. He found a colony of Eskimos on the south side of Whale Sound, and remained long enough with them to become familiar with their habits and to obtain some photographs.

After leaving Whale Sound he continued down the coast, and, under favorable circumstances, completed the survey of the shore, including Cadogen and Talbot Inlets, as far south as Clarence Head. Here he came upon a heavy ice-pack, and was obliged to hold to the Eastward.

During this period of the cruise every effort was made to obtain collections of specimens of natural history; but in this department, as well as in many others, he had frequent occasion to regret the smallness of his corps of workers. He succeeded in obtaining some valuable collections, embracing dredgings from the various points visited, plants from several different localities, skins and skeletons of the principal mammals, skins of many of the Arctic birds, and a large number of skulls of Eskimos. His hunters captured upward of two hundred reindeer. Walrus and seal of different varieties were found in abundance. During the summer several species of waterfowl swarmed upon the islands and cliffs about the mouth of Smith Strait. The

most numerous of these were the little auk (*Uria alle*) and the Eider duck (*Somateria Molissima*), several hundreds of which were captured. From these sources he had no difficulty in constantly supplying his party with fresh food, and to this he attributed in a great measure their entire exemption from disease.

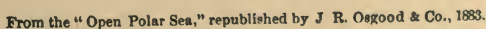
Continuing his voyage southward, he completed the survey of the Eastern Coast of North Baffin Bay, from Cape Alexander to Granville Bay; a survey made independently of the charts of his predecessors. The shore-line surveyed on the eastern side, a portion of which is new discovery, equalled about six hundred miles, and on the western side, between Clarence Head on the south and Cape Union on the north, about thirteen hundred miles.

It was with regret that he turned his back upon the scene of his year's labors and entered Melville Bay, and after boring through the "pack" for one hundred and fifty miles, entered the Southern Water, and reached Upernavik on the 14th of August, and Disco Island September 1. The voyage from Godhavn southward was very stormy. Off Halifax the ship received such injury as required her to put into port for repairs. Leaving this harbor October 19, Dr. Hayes arrived in Boston on the 23d, after an absence of fifteen months and thirteen days.

A just appreciation of his labors has been shown, not only by the flattering reception accorded on his return by the friends of Exploration and the Societies which had encouraged his enterprise, but abroad by the awards of the gold medal of the Royal Society of London, and of the Société de Géographie of Paris; the first of these being received for him May 27, 1867, by Hon. C. F. Adams, United States Minister to St. James, and the second by General John A. Dix, United States Minister to Paris, in 1869. The citations from his Narrative and Chart made in the Reports of Captain Nares are accompanied by the expression "of undoubted authority."

To his two Arctic volumes, "The Arctic Boat Journey" of 1854, and "The Open Polar Sea" of 1860, he added a narrative of a third visit to Greenland in 1869, made in the Steam Yacht "Panther," the property of the Artist, Mr. William Bradford. This volume bears the

Showing
D^R HAYES' TRACK
and discoveries.
1860-61. M.F.



title of "The Land of Desolation," a name re-applied from the chronicles of old John Davis. On the visit, devoted chiefly to the study of the picturesque rather than the scientific, Hayes had the renewed pleasure of observing the formation of the Greenland glaciers and icebergs, as well as of visiting the sites of the colonies of the old Northmen there. The range of the coast along which the "Panther" sailed was more than a thousand miles, terminating a good way beyond the last outpost of civilization on the globe, and in the midst of the much-dreaded ice-pack of Melville Bay.

As an Honorary Member of several Scientific Societies of Europe and America, with an observing eye upon each of the later Arctic Expeditions, he contributed to the press numerous articles on his favorite theme, even amidst the busy occupations of his political life while a member of the Legislature of the State of New York, maintaining a deep interest in Arctic discovery until his death in 1871.

NOTE. — The Annual Report of the Board of Regents of the Smithsonian Institute for the year 1861 contains a Lecture delivered by Dr. Hayes in the hall of the Institution, on his Expedition of 1860. This Report contains also Professor Henry's valuable Summary of Dr. Kane's Explorations. In his Report to the Regents for the year 1865, Professor Henry devotes a large space to a review of Dr. Hayes' scientific work in the North, referring in his review to the agreement of the results with those of Dr. Kane as due to the fact that in both Expeditions the larger part of the Observations were made by the lamented Sonntag.



C. Hall

CHAPTER VI.*

THE GRINNELL AND HAVEN EXPEDITION OF C. F. HALL.—THE FIRST OF HIS THREE VOYAGES, 1860-62.

HALL'S MOTIVES FOR HIS FIRST VOYAGE. — ARCTIC STUDY. — LIMITED RESOURCES. — REASONS FOR BELIEVING THAT SOME OF FRANKLIN'S MEN STILL LIVED. — CIRCULAR ENDORSED BY LEADING MEN OF OHIO. — GENEROUS AID BY MR. GRINNELL AND BY WILLIAMS AND HAVEN. — SAILS FROM NEW LONDON. — BURIES HIS NATIVE COMPANION, KUD-LA-GO. — VISITS HOLSTEINBORG. — THE KYAKS. — THE BELTED AND THE GOTHIC ICEBERGS. — ARRIVES AT CORNELIUS GRINNELL BAY. — FIRST IMPRESSIONS OF THE NATIVES. — DESTRUCTION OF THE "RESCUE," AND THE EXPEDITION BOAT. — FIRST ACQUAINTANCE WITH EBIERBING AND TOO-KOO-LI-TOO. — INLAND EXCURSION. — EXPLORATIONS IN THE SPRING FOLLOWING. — DISCOVERY THAT FROBISHER "STRAIT" IS A BAY. — FINDING OF THE FROBISHER RELICS CONFIRMED BY BARROW'S HISTORY. — EXPLORATIONS IN THE SPRING AND SUMMER OF 1862. — NOTES OF ESKIMO DRESS, HABITS, AND SUPERSTITIONS. — RETURN TO THE UNITED STATES WITH THE TWO NATIVES AND THEIR CHILD.

WITHIN a few weeks of the sailing of Dr. Hayes from Boston, an Arctic voyager, without companions for his exploration, left the port of New London, Connecticut. The prevailing sympathy for the fate of Franklin had kindled in Mr. C. F. Hall, of Cincinnati, an enthusiasm for the search and for Arctic Exploration which failed him only with his life. Through the nine years from the issue of the instructions to Lieutenant DeHaven to the return of the British Yacht "Fox," under McClintock, he had steadily devoted every spare hour to the study of what might be done for the rescue. His means were very limited; he was earning a bare livelihood by the daily labor of an engraver; but he found friends who assisted in

* The preparation of this chapter has been made from a review of Hall's first voyage, chiefly as narrated by himself in his "Arctic Researches," published by Messrs. Harper, N. Y., 1865. Acknowledgments are due Messrs. Harper for the use of the Woodcuts.

The history of the Second and of the Third Expedition in the next chapter, including some statements here found, has been derived from the Official Papers and Correspond-

securing intelligence of what was done by the different Expeditions already named [Chap. I.]; and by the kindness chiefly of Colonel Lupton, President of the Mercantile Library, he was supplied with the fullest Arctic literature.

In 1854 the British Government had felt itself no longer justified in sending out expeditions in search of the "Erebus" and "Terror," but Hall's interest does not seem to have in any degree languished. The British Relief Ship "Resolute" had been abandoned in the ice, picked up at sea by Captain James Budington, of New London, Connecticut, and presented to England by the United States Congress. Hearing that she had been dismantled and laid up as a hulk in the Medway, Hall secured the signatures of Governor Chase and other leading men of Ohio to a petition to that Government for a loan of the ship, in which he might go out to join McClintock in his expedition of 1857-59. The return of the "Fox" anticipated action on this, but he still urged that the explorations made by that ship, though eminently successful, had left much of value to be secured; that they had been made, by necessity, in the month of May, when the land was still covered with snow; and that interviews with the Eskimos had been found practicable with detached parties only, and through an interpreter who, McClintock had said, "did not well understand them." His patriotic sentiments were stimulated by the results of the First Grinnell Expedition; and since England had left the field, "the Stars and Stripes," he thought, "should enter it."

Nothing seems to prove more fully the sincerity and depth of convictions — at times insecurely based — than this expectation of finding officers or men of Franklin's party still alive. The paper found at Point Victory in 1859* showed that Captain Crozier had left the ships

ence of Hall, which were before the author when preparing for the Senate the "Narrative of the Second Arctic Expedition," and when assisting the late Admiral Davis in the preparation, for the Navy Department, of "The North Polar Expedition of 1871-73," — the voyage of the "Polaris." No copy of either of these two volumes is now available for distribution by Congress, the Navy Department, or the Naval Observatory.

* Lieutenant Hobson, of McClintock's party, had found on King William's Land, in a tin cylinder, within a cairn or stone pile, a paper on which was written:—

"28th May, 1847. H. M. Ships 'Erebus' and 'Terror' wintered in the ice in lat. 70° 05' N., long. 98° 23' W. Having wintered in 1846-7 at Beechey Island, in lat. 74° 43' 28"

on their abandonment, with a weakened party and with the remnant of perhaps originally ill-supplied provisions, to find his way toward the desolate regions of Back's or Great Fish river. The presumption in the minds of most men was entirely against the probability of extended life in a single one of the survivors named in that Record.

But all difficulties in the case were overcome or lost sight of in Hall's reasonings, and in his impulse to bear relief. From inquiries of the whalers who visited Cumberland Sound, Repulse Bay, and other northern localities, he learned that the experience of some who had lived for months *as* Eskimos with the Eskimos had not been severe; and from one of Dr. Kane's party, Mr. William Hickey, he received assurance that when he and others of that party had so lived, they recovered from all sicknesses and maintained their health. Hall concluded that some of Franklin's survivors might be still enjoying a lease of life among that not inhospitable people, and he hoped that by his going out and living patiently among them, he could draw out, through faithful interpreters, the final clue to the fate of the ships, the men, and the records of the Expedition. Other reasonings leading him to

N., long. $91^{\circ} 30' 15''$ W., after having ascended Wellington Channel in lat. 77° , and returned by the west side of Cornwallis Island.

"Sir John Franklin commanding the Expedition.

"All well.

"Party consisting of two officers and six men left the Ship on Monday, 24th May, 1847.

"G. M. GORE, Lieut.

"CHAS. F. DES VŒUX, Mate."

Around the margin of this paper, upon which, in 1847, those words of hope and promise were written, the following words had subsequently been faintly traced:—

"April 25, 1848. H.M. Ships 'Erebus' and 'Terror' were deserted on the 22d April, 5 leagues N.N.W. of this, having been beset since 12th Sept., 1846. The officers and crews, consisting of 145 souls, under the command of Capt. F. R. M. Crozier, landed here in lat. $69^{\circ} 37' 42''$ N., long. $98^{\circ} 41'$ W. Sir John Franklin died on the 11th June, 1847; and the total loss by deaths in the Expedition has been to this date 9 officers and 15 men.

(Signed)

JAMES FITZJAMES,

Captain H.M.S. 'Erebus.'

"F. R. M. CROZIER,"

"Captain and Senior Officer.

"and start on to-morrow," 26th for

"Back's Fish River."

In Admiral McClintock's "Voyage of the Fox," the date of the year of Franklin's wintering at Beechey Island is corrected from 1846-7 to 1845-6,—a correction which, as he states, is proved by a glance at the top and the bottom of Fitzjames' Paper.

believe that some of the party still survived, were that no Arctic Explorer had ever understood better the necessities of a good supply of fresh provisions for his men than did Sir John Franklin, and that he had made provision for such necessities. In proof of this Hall had found in the official papers that a full complement of fresh provisions, preserved meats, soups, vegetables, and ten live oxen were on board the "Erebus" and "Terror;" and further, that Franklin had told Captain Martin, of the whaler "Enterprise," when off the coast of Greenland, that he had provisions for five years, and, if necessary, could make them spin out to seven; he would lose no opportunity of killing game, and had already secured a large quantity. There was every reason to believe, too, that animal life was found in abundance by his men on the shores of Wellington Channel, especially in the neighborhood of Baillie Hamilton Island, and that Franklin must have sent hunting parties to great distances with sledges; for the tracks of these sledges were seen six years after by Kane, DeHaven, Ommaney, and Osborne. Hall could say with truth that his expectations of rendering relief were based on years of careful study and examination of what had been written on the subject; and his appeal was plain and strong: "Why should not attempts be renewed again and again until all the facts are known?"

On the 8th of February, 1860, he issued a circular, in the nature of an appeal to his fellow-citizens for aid in his proposed undertaking, which read as follows:—



"This is to memorialize all lovers of man, and of geography, history, and science, to co-operate by all methods and means in their power to facilitate and assist our fellow-countryman, Charles F. Hall, of Cincinnati, Ohio, in the formation of and fitting out an American Expedition, in search of survivors of Sir John Franklin's Exploring party, consisting of one hundred and thirty-eight persons, only twenty-seven of whom are known to be dead; secondly, for satisfactorily settling and completing the history of the last Franklin Expedition; and thirdly, to promote and benefit the cause of geography, navigation, natural history and science.

"Such an expedition, with proper vessels, with a competent and experienced commander, officers, and crew, with a complete outfit and provisions for from two to three years' cruise, to embark from an eastern port of the United States, and proceed *via* Davis' Strait, Baffin's Bay, Lancaster Sound, and Barrow's Strait; thence from the north coast of Boothia to commence the search, extending it to King William's Land and the adjacent regions, until a thorough and satisfactory investigation shall have been made of all that portion of the Arctic world, and the humanitarian object attained for discovering some survivor of the lost companions of Sir John Franklin, or of ascertaining the ultimate fate of the members of that expedition, who, up to this day, remain unaccounted for, being no less than one hundred and eleven souls, whose history the loud voice of mankind from all generous natures demands shall not remain forever shrouded in oblivion while energetic intelligence and American enterprise can hope to rescue a single survivor, or furnish the solution of their ultimate history." This appeal was endorsed by a number of the public men of the State, among whom were its Governor, W. Dennison, Hon. S. P. Chase, and the Mayor of Cincinnati, Hon. R. M. Bishop.

Proceeding to the Eastern States, Mr. Hall visited Dr. Hayes and the relatives and friends of Dr. Kane in Philadelphia, and thence returning to New York, met with much personal encouragement from Mr. Henry Grinnell, and in New England from Messrs. Williams and Haven, of New London. At a meeting of the American Geographical Society of New York he explained his plans, which were in substance that he would first in the North acquire a knowledge of the language and life of the Eskimos, and then visit the lands of King William, Boothia, and Victoria. He would take with him a native interpreter, and, during his sojourn in the North, employ a crew of natives to accompany him. He would first, on reaching Northumberland Inlet, proceed up one of its arms which runs westward, and, crossing by a portage, traverse this lake to its outlet, which is reported by the Eskimos as being a navigable river emptying into Fox Channel. Arriving at "Fox's Furthest" (Lat. 66° 50' N., Long. 77° 05' W.), he would proceed on the east side of the channel to the Strait of the "Fury" and

"Hecla" of Parry, thus connecting Parry's discoveries of 1821 with those of Fox, made in 1631. Succeeding in this, he would hope to winter among the friendly natives of Igloodik, and proceed either southward to the east coast of Melville Peninsula, or push his way across the Gulf of Boothia to Victoria Harbor.

During the winter and spring, sledge journeys would be made to ascertain the chief object of his voyage, and to acquire a thorough knowledge of the country. It was evidently in his mind that preparatory work of a serious character would be necessary before much could be hoped for in the matter of ascertaining even this, and as certainly in the way of securing any further additions to the knowledge of the Eskimos and their land.

Mr. Grinnell, who, at the date of this enterprise, and even much later, retained the latent hope of there being yet a possibility of finding among the natives some of Franklin's men, sent Hall a strong letter of encouragement. He wrote that probably no one was more desirous than himself to ascertain the fate of the Franklin Expedition, and he believed that some of the one hundred and five men who were alive on the 25th day of April, 1848, might still be found among the inhabitants of Boothia, Victoria, or Prince Albert Lands. He advised a visit to the grave of Franklin and to those of some of his officers, which, if searched for in the months of July, August, and September, might be discovered, and would reveal some records of the expedition; adding, "the course you propose to pursue is entirely a new and important one, and I see not why, with the exercise of your best judgment, you may not ultimately accomplish all that could be desired in satisfactorily determining many of the unsettled questions indicated above, as well as increasing our geographical knowledge of that portion of the Arctic regions over which you propose to pass.

"You have my earnest wishes for the accomplishment of the noble object you have in view, and I will cheerfully contribute towards the requisite funds to carry it out."

The firm of Williams and Haven, of New London, made the following generous proposal:

"As a testimony of our personal regard, and the interest we feel in the proposed expedition, we will convey it and its required outfit, boats, sledges, provisions, instruments, etc., *free of charge*, in the barque "George Henry," to Northumberland Inlet, and, whenever desired, we will give the same free passage home in any of our ships."

May 29, 1860, after spending some weeks of preparation in New York and New London, Hall left the latter city, bearing with him the last cordial farewells of Mr. Grinnell, Mr. Haven, and Mayor Harris. The "George Henry" was accompanied by the "Amoret" schooner, formerly known as the "Rescue" of Arctic celebrity, the officers and crews of the two vessels numbering in all twenty-nine persons. Hall's only companion was the Eskimo, Kud-la-go, whom Captain Budington, of the "George Henry," had brought to the United States on his voyage of the preceding autumn. The outfit which the explorer could call his own consisted of a boat built for him by Rogers, the builder for De-Haven, Kane, and Hartstene; one sledge; some twelve hundred pounds of pemmican and meat biscuit; a small supply of ammunition, and a few nautical instruments and thermometers. The dimensions of the boat were: length, twenty-eight feet; beam, seven feet; depth, twenty-nine and one-half inches; the thickness of her cedar planking, seven-eighths of an inch. Loaded with stores and a crew of six persons, she drew but eight inches of water, had one mast for a jib and main sail, a heavy awning for shelter, and lockers at each end large enough for a comfortable sleep by one person. With an outfit no larger than this, Hall could hardly avoid saying on his return that, had he failed in the great undertaking his mind had led him to embark in, it might have been excusable under the circumstances.

Progress toward Greenland, owing to calms and head winds, was so tantalizingly slow, that a fourth week passed while the ship was yet a considerable distance from Holsteinborg. She did not anchor there until July 7, the fortieth day of a passage usually made in thirty. The "Rescue" was another week behind. On the voyage Hall had the usual first experience of a landsman—sea-sickness; recovering from which his journal entries were those of enjoyment of the phenomena of the lengthened day, the aurora, and the icebergs. He met

his first and serious loss in the death of Kud-la-go before entering the harbor. Apparently in good health when leaving New London, the native had contracted a severe disease whilst passing through the fogs on the Newfoundland banks, and rapidly failed in health. His last words were, "*Teik-ko-seko? Teik-ko-seko?*" (Do you see ice? Do you see ice?) This he incessantly asked, thinking he might be near his home. He died about three hundred miles from it, and was buried in the sea in latitude 63° N. Having shown considerable intelligence while in New York, Hall had hoped that he would render him much service throughout his journeys.

From Governor Elborg, of Holsteinborg, some items of interest were learned. The total number of buildings was twenty-nine; the population in the Holsteinborg district one hundred and ninety-seven, only ten of whom were Europeans. In the preceding year the following amount of animal products had been secured, chiefly for exchange with the mother-country, Denmark: Of reindeer, three hundred; of seal blubber, five thousand pounds; blue fox-skins and white, two hundred and fifty; eider down, five hundred pounds; and unsalted codfish, four thousand pounds. The Holsteinborg district was one of the five Danish divisions of Southern Greenland, the total population of the five being six hundred and sixty-three souls.

The harbor of Holsteinborg, called by the English ships, "Wylie Fiord," is an important place for whalers, being well land-locked, though small. The rise and fall at spring tides of about ten feet affords every facility for repairing the damage caused by the ice to ships. Landing is not possible at all times of tide, for "at high-water mark a broad fringe of ice margins the shore, to which it is firmly frozen, and is convenient to step on to from a boat; but at low water this 'ice-foot' is several feet above one's head, and the rocks now exposed are worn smooth and slippery by the constant attrition of ice." McClintock, from whom this note of the landing is cited, had moored the "Fox," two years before, by hawsers to the rocks on each side of the yacht; yet his anchor lay in seventeen fathoms. He found the mountainous, rocky scenery around magnificent, but remarks that a little more animal life would have made it more pleasing. Very few rein-

deer could be seen at the time of his visit, and the five hundred skins only of the year previous were in strong contrast with the three thousand of ordinary seasons.

The little wooden houses of the Danish Governor and residents were found to be scrupulously neat and clean.

"The men and lads," says McClintock, "employ themselves

in hunting and fishing; they are too dignified and lazy to labor in rowing, so it is among the disposable young women one must look for a boat's crew."

In an upper room of the Governor's house overlooking Davis' Straits and the islands of the harbor, Hall found the apothecary's shop, the contents of which the Governor himself dispenses when required; also a quantity of eider-down, like that from which DeHaven and Kane had received supplies for their beds. At supper he was served to duck, salmon, trout, eider ducks' eggs, white flour bread, with butter and American cheese, Yankee-brewed rye liquors, and good tea. He was presented with a valuable collection of Greenland rock specimens, and of fossil fish—capelin—(*Mallotus Villosus*), called by the Greenlanders Angmarset; by the Danes, Sild; and by the English, Capelin. The fish is about six inches long, of a bluish brown color on the back, and silver white on the belly. The fossils were found about one hundred miles up a fiord. McClintock speaks of those he had obtained as being of unknown geological date. The earthquake shocks of which he speaks as having been felt near this harbor, Hall thought were in reality only the results of the freezing in the rock crevices of the



GOVERNOR ELBORG IN HIS OOMIAK.

From McClintock's "Voyage of the Fox."



ESKIMO WOMAN AND CHILD.

Fse-simile of a Woodcut drawn and engraved by the Greenlander "Aaron."

mountains. He noticed several large rocks, thousands of tons in weight, that had evidently fallen from the tops of two lofty mountains. The detached portions corresponded in shape to the parts vacated. "The tremendous workings of nature in these mountains of Greenland during the Arctic winter often result," he says, "in what many of the inhabitants think to be earthquakes."

Before leaving the harbor, Hall purchased six dogs, selecting them at the advice of the Governor, and paying for them ten Danish, or five American dollars; for their food he paid twenty-five cents for two bushels of small dried fish—Capelins. Kayaks in large numbers

danced around the boats of the American barque. The speed and the skill of the Eskimos in these were matter of surprise, the Kayaker showing himself "able to outstrip everything possible



KAYAK SOMERSET.

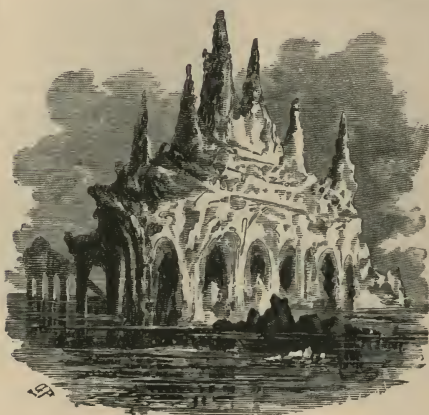
From Hall's "Arctic Researches." Harper Brothers.

in the rowing of boats, outside of the Arctic regions." Two rare sights were witnessed. One of the Eskimos turned somersets in the water seated in his Kayak. "Over and over he and his Kayak went till he heard the cry, 'Enough,' and yet *he wet only his hands and face!*" The feat is performed only by a few; requiring great skill and strength to do it. *One miss* in the stroke of the oar as they pass from the centre (when their head and body are under water) to the surface, might terminate fatally. No one will attempt this feat, however, unless a companion in his Kayak is near. The wetting of the hands and face only is the result of the close fitting of the sealskin dress, which extends from above the shoulders to the round hole in which the

Kayaker sits, so that no water can enter. The first sight of this had caused the expression of McClintock, "it is wonderful to see how closely a man can assimilate himself to a fish."

The other feat witnessed was that of a native running his Kayak, while seated in it, over another. Getting some distance off, he strikes briskly and pushes forward, and in an instant is over, having struck the upturned peak of his own Kayak, nearly amidships, and at right angles of the other. The spectators rewarded these feats with a few plugs of tobacco. The ships' companies enjoyed a cordial welcome in the harbor during the seventeen days of their stay; on the 27th they were in a heavy snow-storm at sea with many icebergs in sight.

Two of these came before Hall's fancy as belted and Gothic towers. The first of these seemed like the ruins of a lofty dome about to fall, a



GOTHIC ICEBERG.

From Hall's "Arctic Researches." Harper Brothers.

portion of its arched roof already tumbling down. "Then in a short time, this was changed to a picture of an elephant with two large circular towers on his back, and Corinthian spires springing out boldly from the broken mountains of alabaster on which he had placed his feet. The third view, when at a greater distance, made it like a lighthouse on the top of the piled-up rocks, white as the driven snow.

It took no great stretch of fancy to finish the similitude when the sun, for nearly the first time during a week, burst forth in all its splendor, bathing with its flood of fire this towering iceberg lighthouse!"

Of the other iceberg, the side facing Hall had a row of complete arches of the true Gothic order; and "running its whole length, were mouldings, smooth projections of solid ice, rivalling in the beauty of all their parts anything I ever saw. The architecture, frieze, and cornice of each column supporting the arches above were as chaste and accurately represented as the most imaginative genius could conceive. Here

and there a matchless perfection displayed itself, in the curvature of lines, and, springing out from a rude recess, at a vast height, appeared a delicate scroll quite in keeping with Hogarth's line of beauty."

July 30, the "George Henry" was within three miles of "Sander-son's Tower," on the west side of the entrance to Northumberland Inlet; August 8, the barque reached her anchorage at Ookooler, the Eskimo name for what has been since known as Cornelius Grinnell Bay.

Before entering the bay, a runaway boat's crew from the whaler "Ansell Gibbs," of New Bedford, was hailed on their southward course home. They stated, that on account of bad treatment, they had deserted from the ship, at Kingaita in Northumberland Sound, and had run the distance from that place two hundred and fifty miles, in less than three days. Captain Budington relieved their extreme hunger, and in pity for the necessities of the deserters furnished some supplies for their perilous voyage, which, according to information received two years afterwards, they succeeded in effecting to the Labrador coast.

The first impression made by the natives around the bay was of a favorable character, especially in reference to their good nature. In noting his impressions, Hall quotes from the reviewer of an Arctic book a reference to the Eskimo race, as being "singular composite beings,"—a link between Saxons and seals,—hybrids putting the seals' bodies into their own, and then encasing their skins in the seals, thus walking to and fro, a compound formation. A transverse section would discover them to be stratified like a roly-poly pudding, only instead of jam and paste, if their layers were noted on a perpendicular scale, they would range after this fashion: first of all, seal,—then biped-seal in the centre with biped—then seal again at the bottom. Yet, singularly enough these savages are cheerful, and really seem to have great capacity for enjoyment. Though in the coldest and most uncomfortable dens of the earth, they are ever on the grin, whatever befalls them. When they see a white man and his knick-knacks, they grin. They grin when they rub their noses with snow, when they blow their fingers, when they lubricate their hides inside and out with the fat of the seal. The good-naturedness referred to here was

endorsed by Hall from the outset of his acquaintance with the natives; their other good points as well as defects were, as would be expected, impressed upon him with differing experiences and judgments throughout his years of sojourn. Quite a number of the people frequented the barque; among them the wife of Kud-la-go, who had heard on shore of her husband's death, and whose tears flowed fast when she saw the treasures which the deceased had gathered in the States, for her and his little child.

On the 16th, the two ships sailed for Nu-gum-mi-uke, their intended winter quarters. Before sailing, two other whalers, the "Black Eagle" and the "Georgianna" had come in from another whaling-ground. The harbor entered by the "George Henry" was not easy of access, but safe; Hall gave it the new name of Cyrus W. Field Bay, which it retains.

On the 21st, the "Rescue" was sent by the captain to examine the availability for a fishing depot of an inlet on the other side of the bay, and Hall accompanied it, making his first visit to the scene of the landings of the voyagers under old Sir Martin Frobisher, three centuries before. Here he made discoveries of value; and here he lost his "Expedition Boat," the only means on which he could rely for the prosecution of his westward journeyings.

The gale which brought these disasters was a severe one. Three vessels, the "Barque," the "Rescue," and the whaler "Georgianna" were anchored near each other in the bay September 27, when the storm began; it increased by 11 P.M. to a hurricane. The "Rescue" after dragging for some hours, dashed upon the breakers, a total wreck; the "Georgianna" struck heavily on the lee-shore.

THE EXPEDITION BOAT LOST.

Hall's boat was driven high upon the rocks, nothing being afterward found of her, except her stern-post; but before the howl of the tempest ended, he was asking of Captain Budington the loan of a whale-boat to replace his loss: he was unable to secure one.

With a party of Eskimos, he visited Captain Parker of the "True Love," an old whaler of forty-five years' Arctic experience, and, explain-



WRECK OF THE "RESCUE," FORMERLY OF DEHAVEN'S EXPEDITION, IN AN INLET OF C. W. FIELDS BAY, LAT. 62° 52' N.,
LONG. 64° 44' W., SEPT. 28, 1860.

From Hall's "Arctic Researches." Harper Brothers.

ing to him his plans and the loss of his expedition boat, received the promise of one additional to the whaleboat, which he hoped to get from the "George Henry" for his westward voyage. The party were piloted through a passage from which no opening to the ship could be seen by the woman *Nik-u-jar*, who, knowing every channel and inlet within two hundred miles of the anchorage, and seated on the loggerhead of the boat, with her pretty infant in her hood at the back of her neck, steered directly to the spot. Unfortunately the "True Love," a few

days afterward, being driven from her anchorage by a gale, went off to sea, and Hall was thus disappointed both in the loan of the boat, and even in the opportunity of sending letters home.

His original plans were finally arrested, and his attention was given during the stay of the "Barque" only to the language and habits of the people, to observations of natural phenomena, and to the dis-



NIK-U-JAR, THE BOAT-STEERER AND PILOT.

From Hall's "Arctic Researches." Harper Brothers.

coveries of the Frobisher remains, and the location of the old attempted settlements under that explorer. The story of these is spread out in an easy but exceedingly diffuse style in his "Arctic Researches," the thread of which will now be followed.

Within the month following the loss of the boat, the native, Ebiebing (afterward called Joe), with his wife, Too-koo-litoo (Hannah), came to the cabin of the whaler. Joe had recently piloted to the Bay the "True Love" and the "Lady Celia," through a channel more than one hundred and twenty miles long, behind a line of islands facing the sea. Too-koo-litoo at once impressed Hall with an expectation of valuable assistance from her, as she as well as her husband appeared to

be intelligent and spoke English quite fluently. They had acquired this from a residence of twenty months in England. Hannah promptly set herself to learning to read under Hall's teaching.

November 19, the ice from the head of the bay began to bear down upon the ship, and by the 6th of the month following she was secured



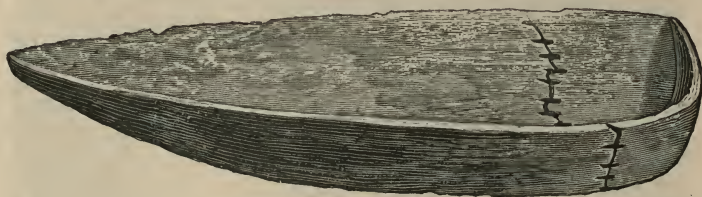
ESKIMO DOG.

in winter quarters. The temperature was, however, $+5^{\circ}$, and the weather moderate and clear. The temperature of the sea-water November 24th was 26° , and of the air 18° ; the barometer read 29.55. December 8, the thermometer was at zero; on the 9th it was 47° below the freezing point. The ice was solid around the ship, the season not uncomfortable. December 20, the thermometer read -5° ; on the 21st, $+21^{\circ}$; on the 22d, $32^{\circ} 5'$. Rain on the last of these days destroyed much of the native covering of the *igloos* (snow-huts), and the ex-

traordinary mildness of the season prevented the usual hunts. The natives suffered for supplies. January 5, the thermometer registered 60° below the freezing point.

HALL'S FIRST SLEDGING.

On the 10th Hall left Rescue Harbor, lat. 62° 52' N., lon. 64° 44' W., on his first inland excursion by sledge and dogs. Having now acquired some knowledge of the native language, and having the company of the two natives just named, with a third, Koodloo, a relative of a woman whom he had befriended when dying, he thought himself ready for the discomforts of an Arctic journey. His sledge was loaded for a team of ten dogs, with a fair outfit of clothing, provi-



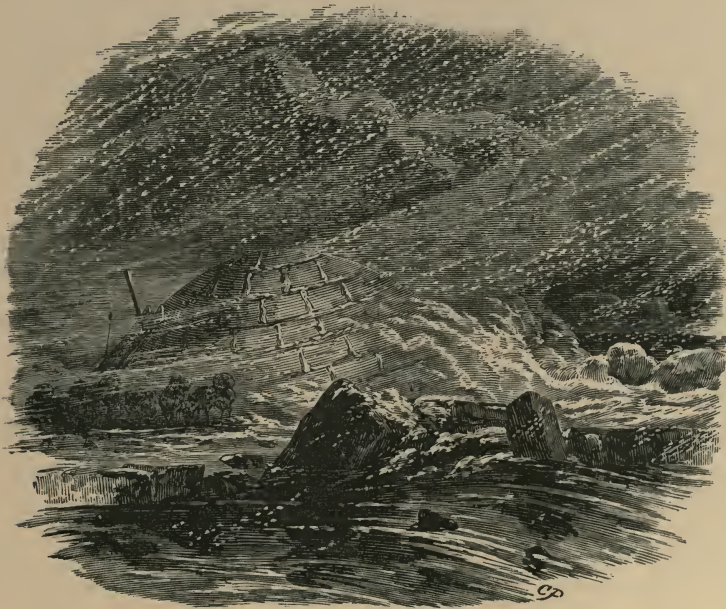
LAMP.

The mending done by Eskimos.

sions, and sleeping comforts; his telescope, sextant, thermometer, and marine glass; a rifle, with ammunition; and a Bowditch Nautical Almanac, and other books. Too-koo-litoo at first led the way, tracking for the dogs, which Ebierbing managed well; but, on nearing the frozen waters of the ocean, where it was necessary to lower the sledge to the ice, the dogs were detached, while the woman, whip in hand, held on by the traces, which were from twenty to thirty feet long. The difficulty of the outgoing tide being overcome, the party, under the same leader, again made some six miles over the ice, and finding good material for building a snow-house, encamped at five P.M. The fitting up of the igloo—always the work of the igloo wife—was done by first placing the stone lamp in its proper position, trimming it, and setting over it a kettle of snow; then placing boards upon the snow-platforms for beds, and spreading over them the canvas, containing some of a dry shrub, gathered for this purpose, and on this

the *tuk-too*, or reindeer-skins; over the fire-lamp the wet clothing was hung, to be turned during the night by the wife's watchfulness. From the fatigue of the day Hall's first night was passed in sound sleep, even after a dinner of raw salt pork. At nine the next morning he was ready for a new start.

The second advance was one of but five miles, at the end of which a new igloo was built on the ice, on which, however, a strong gale detained them many hours, and threatened destruction to the whole



STORM BOUND.

From Hall's "Arctic Researches." Harper Brothers.

party by breaking up the floe. On the morning of the third day an opening with a snow-knife through the domè of the igloo showed a clear sky, but the ice was moving in every direction, and the snow very deep. Travel became very difficult, nearly exhausting them by two P.M.; but, on finally reaching the shore ice, the party was able to encamp on Rogers Island, alongside of another igloo, where refreshment was obtained. In the morning a lookout on the bay showed that all the ice on which they had been camping had gone out seaward. They had been saved.

The severity of the season which had now overtaken him prevented the further explorations which Hall hoped to make, and this first of his Arctic experiences outside of the comforts of the ship proved to be a sharp discipline. During the forty-three days thus spent he suffered severely from the want of food, as well as from exposure. On the 19th he supped on raw, frozen whale-hide, the next night all that he had to eat was black whale-skin, and he longed even for more of the blackened scraps, saved for the dogs, but which were swallowed whole by a native woman. He kept himself at times from freezing only by sitting in bed with much fur around him, and yet he wrote his journal with the thermometer at zero inside the igloo, outside at -25° to -52° . Partial relief came by supplies received through Ebierbing from the ship and from a seal caught by him. His first attempts at a return to the ship were arrested by his extreme weakness, for the Arctic exposure of his life thus far had begun to tell upon him, but on the 21st he succeeded in getting on board. He considered that his sojourn had given him valuable experience; and looking back on it afterward, he says "he enjoyed it, being as happy as circumstances would permit."

On his return to the "George Henry," the first night was a sleepless one, the change from the pure atmosphere of the snow-house to the confined air of the cabin bringing to him "a sweating process," with suffering. On his recommendation to send two of the crew, seriously afflicted with scurvy, to stay with the Innuits and live exclusively on fresh meat, walrus, and seal, Captain Budington sent them to the friends whom Hall had made at Oopungnewing, seventeen miles distant. But the two men soon tired of igloo-life, and at their first relief from sickness set out to return to the barque: one of them, persistently holding on his course and leaving his Inuit companions, lost his way in the snow, and after a long search was found frozen dead.

SPRING EXCURSIONS.

April 22, 1861, the extreme severity of the season having passed, Hall set out on a second excursion to explore the land on what was marked on the charts as Frobisher's Straits. His companion was

Koojesse, a native well acquainted with the country, who had made for him one of the almost invariably accurate native charts. As the travel was to be on foot over the ice, Hall's light equipment for the journey was attached to him by a strap passing over his shoulders across his breast, and down the back.

The travellers crossed Field Bay, thence over a fatiguing mountain pass through a magnificent gorge between high rocks, and thence along a small inlet of the Countess of Warwick Sound, where, upon an abrupt turn, they caught sight of the water. In the distance were the peaks of *Meta Incognita*. The natives here first told Hall of the traditions, that white men, a long time ago, had masted a ship at this spot. This first intimation of the times of old Frobisher, three centuries before, was exciting; still more so, however, was the demonstration the day following, that the so-called strait was in reality a bay. He had expected to pass through this opening westward, in the prosecution of his original plan for the search of Franklin's men; but before his eyes lay the open waters of a bay, its surface dotted over with floating broken ice. A week further was passed in making further investigations, mapping the locality, and accurately placing on record all that was supposed to bear on Frobisher's Expedition, the time being spent chiefly in a snow-village of "pure white igloos."

During the next month a larger number of traditionary items were obtained from the natives, in regard to the old Expedition; chiefly from the aged grandmother of Ebierbing, whose name was Ookijoxky-Ninoo. Too-koo-litoo was the interpreter between Hall and this native, the substance of whose statement was, that frequently in her lifetime she had seen on the neighboring island of Ni-oun-tilik, coal, bricks, and large pieces of very heavy stone, black, such as no Innuits had ever seen before; that she had heard from old Innuits, that "many, many years ago, "ships had come with Kod-lu-nas aboard, two first coming, then two or three, and then very many; that five white men, captured by Inuit people, had lived among them till the next opening season, and then left the country in a large boat which they had built with masts and sails; and that the Kod-lu-nas had killed some Innuits and carried off others. The very heavy stones, of which the old woman spoke, Hall

at once thought must be iron, and Ebierbing and Too-koo-litoo thought so too. They were the only Innuits who, having visited England, recognized the bricks, and had themselves seen them. This information, drawn from a woman appearing to be at least a hundred years of age, sufficed for Hall's determination to visit Ni-oun-tilik. It set his mind upon the possibility of valuable discoveries in a land where he had already collected a chart of its waters. He was astonished at the power of memory and the remarkable way in which the people of the icy North could preserve history from one generation to another, without a written language. He was also confirmed in the belief that he could certainly learn from such people the fate of the lost Polar Expedition. As he had now but little hope of securing on this voyage a boat for King William's Land, or at least of setting out westward until late in the season, he determined to visit the waters which he justly, from that date, names only as Frobisher Bay.

May 27.— He set out from the ship with dogs and sledge, accompanied by Ebierbing and two of the native women, and on this first of a series of short journeys to the bay, found some additional links to the Frobisher Expedition. He also heard one story, his report of which reaching the United States was afterwards regretted by himself and others. It seemed to indicate the wreck of Franklin's ships in this region, but was the true account of the wreck of a British whaler.

During the month of June a second excursion was made, on which Hall visited the north Foreland of Frobisher; and in July, the ship having left her anchorage in search of whales, he took up his abode with Ebierbing on shore, and with him renewed his explorations of the country, finding on his trips pieces of sea-coal, further confirming the old traditions. To satisfy himself more rigidly, he dug down into the centre of a coal-heap, "around and beneath clods of thickly-matted grass, around and beneath stunted willow, and 'crowberry' shrubs, around and beneath mosses, and wherever he made these examinations, he found coal. Many places overgrown with grass he examined, digging down a depth of several inches and overturning sods exhibiting coal at the base, then a layer of sand and coal, then another layer of two or three inches of sand overlapped by interlocked roots, whence



PASSING THROUGH LUPTON CHANNEL.

From Hall's "Arctic Researches." Harper Brothers.

extended thrifty grass. The roots of the stunted willow, half an inch in diameter at the base of the trunk, pierced down into the sand and thence into coal! On examination of many pieces of coal, bedded — some in grass, some in sand, and some in moss — the upper side exposed to the air, was found to be covered with pellicles of black moss, such as one finds upon the rocks of ages.”



INDIAN SUMMER VILLAGE.

From Hall's "Arctic Researches." Harper Brothers.

This convinced him that this coal had lain there for centuries; and by other strong indications he was justified in referring it to the Frobisher voyages of 1557–1559. During the month of August, he completed the survey of the bay he had now discovered.

An interesting boat-voyage was made on this exploration. He left the ship with three natives and their wives, encountering at first much ice driven in from the Straits, and a thick fog, and in the evening reached the entrance of Lupton Channel, through which a strong tide was running into Field Bay, “foaming, whirling, roaring, and boiling

like a cauldron;" by dint of hard pulling the boat got through. In a tupik on shore, after a good supper on seals, ducks, and coffee, cooked with wood from the wrecked ship "Traveller," the party were closely packed for the night.

While passing through Bear Sound, Hall witnessed a novel mode of securing ducks. Whenever one of the flock which had dived on the water popped up its head, the Innuits made a great noise throwing about their hands and arms to frighten the bird down again, and repeating this same noise and frantic gestures without a moment's breathing-time for the terrified duck, until in about seven minutes it came to the surface

utterly exhausted, and was easily captured. By this process of drowning ducks, quite a number were secured amid the boisterous merriment of



THE TRENCH, ONE OF FROBISHER'S "GOLD MINES."

From Hall's "Arctic Researches." Harper Brothers.

the natives, which was echoed from the rocks of the Sound.

At a native summer village visited on the route, the women were found busily occupied in sewing up skins to make a *kia*. The covering of the boat was hung over a pole resting on the rocks, everything being kept wet, while the women worked their sewing by large braided thread of white whale-sinews. Venison and seal meat were hung to dry on strings stretched along the ridge of each tupik; at that season provisions were abundant.

In September, the most interesting discoveries were made. On the top of Bishop's Island, from which the whole coast could be seen, were found the ruins of a house, which had been built of stone, cemented with lime and sand, every part of it being covered with old moss, and on the north side of the Island was found an excavation, which was called

a ship's trench, for the Innuits said that was where a ship had been built by white men. It had been dug out of stone, which was of such a nature as to yield to the persevering use of pick-axe, sledge-hammer, and the crowbar. The bottom of the trench, which was one hundred and ten feet in length, was an inclined plane, running from the surface of the ground to a depth of twenty-five feet at the water's edge.

From what Hall saw he was fully convinced that very many years ago, men of civilization did live on this island, called by the Innuits *Kodlunarn*, and that they built a vessel, probably a schooner, there. The trench by the shore, on the inclined plane, was such as is used in building a ship on stocks; there were ruins of three stone houses, besides coal, flint-stone, fragments of tile, glass and pottery, and large masses of iron pyrites or bisulphide of iron. The finding of this and its significance can be gathered from the following facts: Of the one hundred men sent out from England with Frobisher in 1578, the majority were "miners," sent for the express purpose of digging for the "rich ore" of which Frobisher had carried specimens home on his return from his second voyage,—the ore being supposed to be very valuable, the miners made proofs in various parts of the regions then discovered. It was some of these proofs which had now been found, and they showed that Hall had been on the precise spot of the Countess of Warwick's mine. Delighted with these discoveries, and gathering up as many relics as he could carry in his old stockings, mittens, hat, and everything that would hold them safely, he labelled each article and returned to his companions in the boat, on the 27th, regaining the ship in Parker's Bay. The company were warmly welcomed, as both the ship's crew and Innuits had scarcely expected his safe return in the leaky whaleboat of their journey. Hall had with him Sir John Barrow's "Chronological History," which gave him in substance this account of

FROBISHER'S THREE VOYAGES.

In the year 1576, by the countenance and assistance of Dudley, Earl of Warwick, and a few friends, Frobisher was able to fit out two small barks, the "Gabriel" of thirty-five, and the "Michael" of thirty

tons, together with a pinnacle of ten tons. With this little squadron he prepared to set out on his important expedition, and on the 8th of June passed Greenwich, where the court then was, and Queen Elizabeth bade them farewell by shaking her hand at them out of the window.

July 11, 1576, the ships came in sight of Friesland, rising like pinnacles of steeples, and all covered with snow. *This island, whose position has so greatly puzzled geographers*, could not be the Friesland of Zeno, but, being in 61° of latitude, was evidently the southern part of Greenland. The floating ice obliged Frobisher to stand to the south-west, till he got sight of Labrador, along the coast of which he then stood to the westward, but could neither reach the land, nor get soundings on account of the ice. Sailing to the northward he met with a great island of ice, which fell in pieces, making a noise as if a great cliffe had fallen into the sea. After this he entered a strait in lat. $63^{\circ} 8'$. This strait, to which his name was given from his being its first discoverer, is the same which was afterwards named Lumley's Inlet, but Frobisher's Strait was *for a long time supposed by geographers to have cut off a portion from Old Greenland*, till Mr. Dalrymple and others showed the fallacy of such a supposition. . . .

Frobisher set sail for England and arrived at Harwich on the 2d of October, 'highly commended by all men for his greate and notable attempt,—but specially famous for the great hope he brought of the passage to Cathaia.' That hope, however, would probably have died away, but for an accidental circumstance which had been disregarded during the voyage. Some of the men had brought home flowers, some grass, and one, a piece of stone 'much like a sea cole in color,' merely for the sake of the place from whence they came. A piece of this black stone being given to one of the adventurers' wives, by chance she threw it into the fire, and, whether from accident or curiosity, having quenched it while hot with vinegar, 'it glistened with a bright marquesset of golde.' The noise of this incident was soon spread abroad, and the stone was assayed by the 'gold finers of London,' who reported that it contained a considerable quantity of gold. A new voyage was immediately set on foot for the following year, in which

we are told by Master George Beste, Frobisher's Lieutenant, that the Capitaine was specially directed by commission to search for more of the gold ore rather than for the Northwest Passage.

SECOND VOYAGE, (1577).

Frobisher was now openly countenanced by Queen Elizabeth, and on taking leave for his *Second Voyage* had the honor of kissing her majesty's hand, who dismissed "him with gracious countenance and comfortable words. He was besides furnished with one tall ship of her Majesty's, named 'y^e Ayde' of two hundred tunne, or thereabouts; and two other litile barks likewise, the one called the 'Gabriell,' whereof Master Fenton was Capitaine; and the other the 'Michael,' whereof Master York, a gentleman of my Lord Admirall's, was Capitaine," those two vessels were about thirty tons each. On the 27th May (1577), having received the Sacrament and prepared themselves "as good Christians toward God, and resolute men for all fortunes," they left Gravesend, and after a long passage fell in with Friesland, in lat. $60\frac{1}{2}^{\circ}$, on the 4th of July, the mountains covered with snow, and the coast almost inaccessible from the great quantity of drift ice. . . .

Four days were here spent in vain endeavor to land, after which they stood for the strait, discovered by them the preceding year. They arrived off the north foreland, otherwise Hall's island, so called after the man who had picked up the golden ore, and who was now master of the "Gabrielle." They proceeded some distance up the Strait, when, on the 18th of July, the general taking the gold finers with him, landed near the spot where the ore had been picked up, but could not find in the whole island "a piece as bigge as a walnut," but all the neighboring islands are stated to have good store of the ore. On the top of a high hill, about two miles from the shore, "they made a columnne or crosse of stones, heaped up of a good height together in good sort, and solemnly sounded a trumpet and saide certaine prayers, kneeling about the ensigne, and honored the place by the name of Mount Warwicke. . . . They now stood over to the southern shore of Frobisher's Strait, and landed on a small island with the gold finers to search for ore; and here all the sands and cliffes did so glister, and had

so bright a marquesite, that it seemed all to be golde, but upon tryall made, it proved no better than black lead and verified the proverbe ; — ‘all is not golde that glistereth.’ ” . . .

As the season was far advanced and the General's commission directed him to search for gold ore, and to defer the further discovery of the passage till another time, they set about the lading of the ships, and in the space of twenty days, with the help of a few gentlemen and soldiers got on board almost two hundred tons of ore. On the 22d of August, after making bonfires on the highest mount on this island, and firing a volley for a farewell “in honor of the Right Hon. Lady Anne Countess of Warwicke, whose name it beareth,” they set sail homewards, and after a stormy passage, they all arrived safe in different ports of Great Britain, with the loss of only one man by sickness, and another who was washed overboard. . . .

THIRD VOYAGE (1857).

The Queen and her court were so highly delighted “in finding that the matter of the gold ore had appearance, and made show of great riches and profit, and the hope of the passage to Cathaia by this last voyage greatly increased;” that after a minute examination by Commissioners specially appointed, the voyage was determined to be highly worthy of being followed up. The Queen gave the name of *Meta Incegnita* to the newly-discovered country, on which it was resolved to establish a colony. . . . The fleet sailed from Harwich the 31st May, 1578, and, on the 20th of June discovered West Friesland, which they now named West England. . . . They found the Strait choked up with ice, and the bark “Dennis” received such a blow with a rock of ice that she immediately sank, but the people were all saved. A violent storm now came on and the whole fleet was dispersed. . . . They all, however, arrived at various ports of England about the 1st of October, with the loss by death of about forty persons.

NEW HOPES.

The investigations which Hall had now made in connection with the traditions received from the natives, were a large compensation for the

disappointment of his first plans. He began to think that he might yet hope for the realization of those earlier designs, and that these discoveries would assist him toward securing the means for their prosecution. The whaler intended to return to the United States on the 20th of October, but a solid pack being seen in Davis' Strait she found herself ice-imprisoned for the winter. Captain Budington expressed his thanks to Hall for his discovery of this pack, without the knowledge of which he had been about to weigh anchor, and would have been caught in the pack without the power of retreat.

The remaining months of the autumn of 1861 and the winter following embraced the usual routine of Arctic life of the season. Hall had opportunities of adding to the traditionary information he had gathered on this point of so much historic interest. Accustomed by this time to the exposures of an Arctic winter, and having made sufficient advance in his use of Inuit words to put questions to the natives and understand many of their replies, his difficulties lessened, and his occupations brought to him increasing interest and value.

The ship's company were not fully supplied with provisions for a second winter, but were made comfortable by the labors of the Innuits in their hunts of the seal and the walrus. On the occasions of theatrical performances on board, the Innuits crowded in, frequently amusing the crew by their performances on the Key-low-tik, and the superstitions of the An-ge-ko — customs which will be described hereafter.

In the middle of December, the thermometer being 20° below zero, Hall made an excursion of a week to the point named Jones' Cape. He notes a singular incident occurring to his dog-team. "When they put their feet into the snow and sea-water, it was like stepping into a flood of molten gold, and the phosphorescent light thus produced was not confined to the space beneath the dogs and the sleds, but spread itself around and continued for several seconds."

The season was not without an experience of suffering by the natives themselves; several dying from the disease of consumption, and a number of their toils and hunts being made without success. They received among them at different times one or two of the ship's crew sent to recover their health on igloo food.

In the early part of the spring of 1862, Hall renewed his explorations in and around the harbor, and upon Kod-lu-narn discovered additional relics of the Frobisher Expedition, and the traces of old blacksmiths' furnaces and forges. April 1, he had again left the ship in company with four of her crew and four Innuits in a whaleboat, having whaling apparatus lashed to a sled, which a good team of nineteen dogs was to drag. Reaching the native village Oopungnewing in nine hours, they found some of the whaler's crew living there, and in good health, and Hall himself remained there for some days. Resuming his trip he went out on the sea-ice, making good advance with a sled heavily laden with *kow* (walrus-hide), and at four P.M. rested in an igloo.

BUILDING AN IGLOO.

The natives' mode of building these was as follows:—“They first sounded or ‘prospected’ the snow with their seal-spears to find the most suitable for that purpose. Then, one commenced sawing out snow-blocks, using a hand-saw, an implement now in great demand among the Innuits for that purpose; the blocks having been cut from the space the igloo was to occupy, the other Inuit proceeded to lay the foundation tier, which consisted of seventeen blocks, each three feet long, eighteen inches wide, and six inches thick. Then commenced the *spiraling*, allowing each tier to fall in, dome-shaped, till the whole was completed, and the key-stone of the dome or arch dropped into its place, the builders being within during the operation. When the igloo was finished two Innuits were walled in; then a square opening was cut at the rear of the dwelling, and through this Smith and I passed some snow-blocks, which we had sawed out. These Sharkey and Koojesse chipped or minced with their snow-knives, while Tu-nuk-der-lien and Jennie trod the fragments into a hard bed of snow, forming the couch or the dais of the igloo. This done, the women quickly erected on the right and left the fire-stands, and soon had fires blazing, and snow melting with which to slake our thirst. Then the usual shrubs, kept for that purpose, were evenly spread on the snow of the bed-place over which was laid the canvas of my tent; and over all were spread tuktoo furs forming the bed. When the work had been thus

far advanced, the main door was cut out of the crystal white wall, and the walrus-meat and others were passed in. Then both openings were sealed up, and all within were made happy in the enjoyment of comforts that would hardly be dreamed of by those at home."

But from the 22d of the month, for nearly ten weary days, Hall had to remain encamped on the main ice off the land, and the natives were



ESKIMO AND HIS SEAL-DOG.

From Hall's "Arctic Researches." Harper Brothers.

unsuccessful in every attempt to secure either the seal, the walrus, the white whale, or any game. The only food within the igloo was the *kow* (walrus-hide) with the hair on; their lamp was without oil, and without it they could have no fresh water. The capture of two seals at last brought relief.

Again pressing forward, he completed a lengthened exploration of nearly two months, arriving at the George Henry's anchorage May 21. The details of this journey and of his survey occupy a large space in the volume of his "Researches." His corrections of the charts of the locali-

ties examined have been of value to the whaling fleets, which have continued, though with less frequency, to visit them.

His experience of Eskimo life and forced self-adaptation to it, begun on this voyage, seems, strangely enough, to have carried its attractions through the second visitation and residence of five years, which is yet to be described. His acquaintance with the inside life of the degraded and the superstitious, and with their modes of obtaining their supplies, will be best portrayed by selections from the records of his later residence; what here follows may show his first impressions corrected by those experiences.

As regards the appearance of the Innuits, as he justly prefers to call them, without noting their average *low* stature, so well known, even in comparison with that of those on the northwestern American coast, Hall notes that the women were found generally tattooed on the forehead, cheeks, and chin. The process for this is simply the drawing of a soot-blackened reindeer-sinew thread under and through the skin by a needle; the tattooing is done from principle; the lines, as they believe, will be regarded in the next world as a sign of goodness. Neither for the females of this region nor for those around Hudson's Bay does he express himself in any commendation of an attractive personal appearance, thus indicating a contrast between these and the natives of Greenland, of whom each Arctic voyager has spoken in praise.

The native dress for winter is of reindeer-skin; for summer, of the seal. The round jacket without opening in front or behind is slipped over the head, is close-fitting, comes as low as the hips, and has sleeves reaching to the wrists. It has a hood at the back for covering the head in cold weather, or carrying the children (see page 176), and is often very elaborately ornamented. The wife of one of the natives had her jacket trimmed thus: Across the neck a fringe made of eighty pendants of red, blue, black, and white glass beads, forty on each string; on the flap in front, bowls of Britannia metal, tea and table-spoons; on the tail reaching nearly to the ground, six pairs of federal copper cents pendant down the middle; and a huge brass bell from some old-fashioned clock at the top of the row of cents. In winter two jackets are worn, the inner

one with the hair next the body. Their breeches reach below the knee, and are fastened with a string drawn tightly around the lower part of the waist. Those worn by the women are put on in three pieces, each leg and the body forming separate parts.

The full winter dress consists of: first, long stockings of reindeer fur, with the hair next the person; second, socks of the eider-duck skins, with the feathers on and inside; third, socks of sealskin, with the hair outside; fourth, kumings (native boots), with legs of tuktoo, the fur outside, and the soles of ook-gook. All wear mittens, though the women generally wear only one, and that one on the right hand; the left is drawn within the sleeve.

The mode of capture of the bear, the reindeer, the whale, and the walrus will be noted in the account of the Second Expedition. Hall, at an early period of his first voyage, noticed two remarkable qualities in the native character, which have a strong bearing upon their success in obtaining a livelihood. One of these is the accuracy with which they sketch the lines of coast and the ice-foot, aiding their journeyings; outlines of



SEAL-HOLE AND SEAL-IGLOO. — No. 1.

From Hall's "Arctic Researches." Harper Brothers.

marked correctness were made for him. A sketch of superior accuracy, as endorsed by the charts of distinguished Arctic navigators, will be found in the Narrative of the next voyage.

Of the Innuît sagacity in gaining lessons of value from the habits of the animals he says that they observe how the seal constructs its own igloo, and model their own winter dwellings from it.

Sectional view No. 1 shows a seal's hole and igloo with a *young one* lying within and a mother coming up to visit it. The horizontal

lines in the engraving, and those across the seal-hole, represent seawater; the perpendicular lines, ice. By the time the sun has melted off the snow covering, destroying the dome, the young seal, for which this home has been made by its prospective mother, is ready to take care of itself. The season for their building is about April 1.

To capture the seal the native always needs his dog, who, however, only scents the igloo, leaving his master to catch the game. The sealer is awaiting the seal's blow, for which he has sometimes to watch motionless two or three days and nights. At the point indicated by his dog, he thrusts down the spindle of his steel spear, to find through the snow the breathing-hole of an inch or two in diameter; then, withdrawing his spear, he strikes it again unerringly through the snow, eighteen to twenty-four inches, to the seal's head. The animal dives and runs out the full length of the line in the sealer's hand, but he soon draws out his prize from the hole which he has enlarged with his ice-chisel.



SEAL-HOLE.—No. 2.

When a seal is taken, a few drops of water are sprinkled on its head before it is cut up; if no water is to be had, snow is held in the hand until a drop is squeezed out. Women are not allowed to touch the first seal of the season, even to press out its oil for others.

FIRST IMPRESSIONS.

The Innuits, as is well-known, eat voraciously. Hall says on one occasion he was compelled to say to himself: "What monstrous stomachs these Eskimos have." They had been cutting up the *krang* (whale-

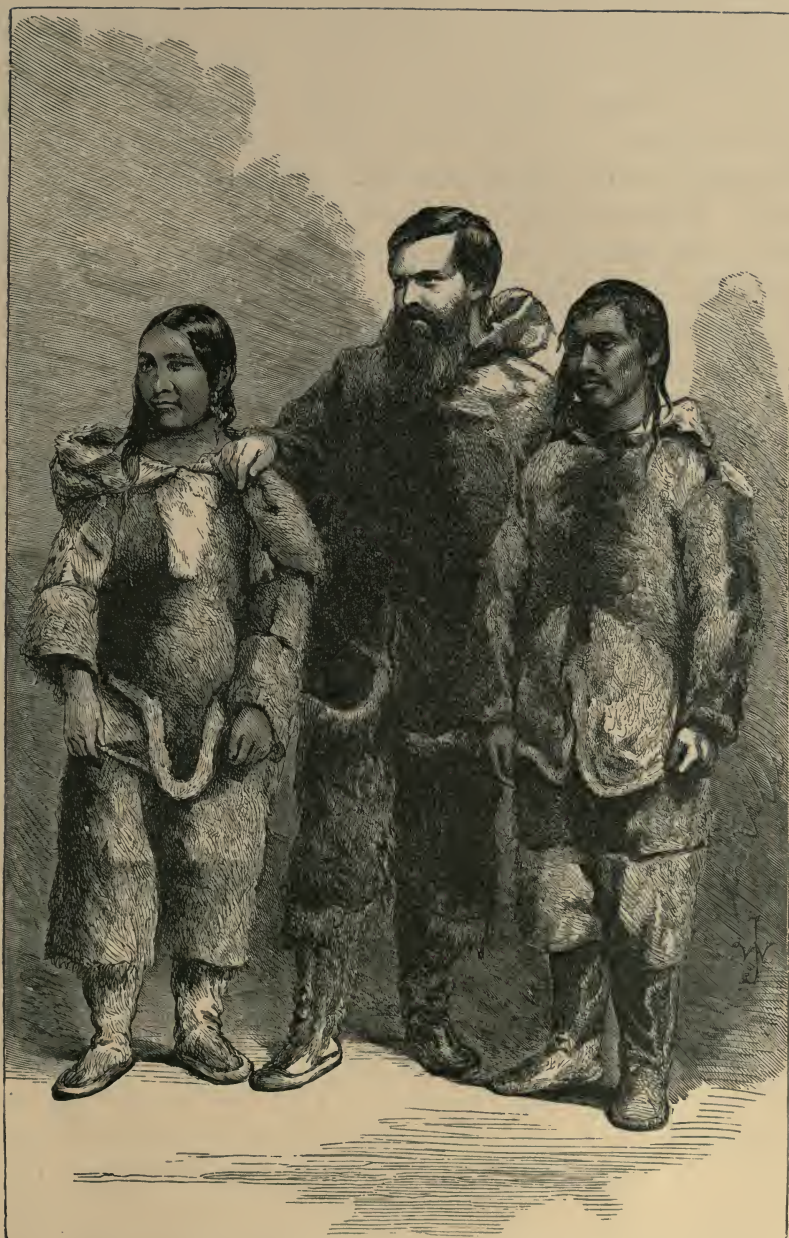
meat) into huge slices and sending it to the village for deposit, but all day long as they worked they ate. "The quantity taken on one day seemed enough for many." Before this whale had been brought alongside the "George Henry," they had eaten twenty square feet of the raw skin.

The language of the natives of Northumberland Inlet is a dialect understood with great difficulty by natives who come from the North and West, and is still more difficult for the people of Greenland. The Innuits of Hall's first acquaintance could not count beyond ten by words; by signs, that is by throwing open the fingers, they could go further.

Their religious ideas and observances are chiefly under the influence of their An-ge-kos, whose business, like those of the Medicine Man of the *Shammans* of the Western coast, is to minister for the sick, and for the community in general. His mode of procedure, when called in for the sick or for any case of supposed special relief, is first, to demand immediately his pay, and then, with the family around, to begin incantations or what sounds like a prolonged supplication with formulas responded to by the company. The An-ge-ko is employed also in ankooting for success in the hunts, for the disappearance of the ice, and for a good season. On more than one occasion he was found to be graspingly covetous and otherwise immoral, but is almost universally feared and obeyed. The name An-ge-ko was reported to mean "he is very great."

RETURN TO THE UNITED STATES.

Hall's return from this first voyage was now compelled by the release of the ship, the whaling season of the year having ended. He had acquired some useful knowledge of Eskimo life and language, the further in which he advanced the more he hoped to turn it to advantage on a renewed voyage. August 9, the "George Henry" took a final leave of the inmates of the bay, a crowd of whom surrounded her in their Kias and Oo-miens, waving their partings and shouting their *Ter-bou-etie* (farewell). In his Journal, three months before, he had written, "Ebierbing and his *nuliana*, Too-koo-litoo, will accompany me to America, and on a future Expedition to King William's Land. I

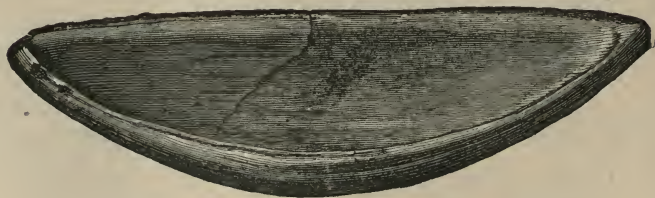


TOO-KOO-LI-TOO, HALL, AND EBIERBING.

From Hall's "Arctic Researches." Harper Brothers.

hope, after what I have done here in the North, I shall have no insurmountable obstacle to overcome in preparing for that voyage. That the Innuits are still living who knew all about the mysterious termination of the Franklin Expedition, I have not the shadow of a doubt. What is requisite is to visit those regions, get acquainted with the Innuits there, become familiar with their language, and then learn the history." The two natives had expressed a desire to go to the United States, fearing only that their child might die on board ship; at an hour's notice, with their child and their seal-dog, they were on their way to the barque from their hut, seven miles distant.

After working through the ice for twenty-four hours, the barque was fairly at sea. Without any special incident except their falling short of provisions and their inability to obtain relief from ships met with, the "George Henry" reached St. John's August 23, and New London September 13, 1862, — Hall thus ending his voyage and explorations of two years and three and a half months in and about the Arctic Seas. But he was already planning a Second Expedition.



ESKIMO LAMP.

CHAPTER VII.

HALL'S SECOND ARCTIC EXPEDITION.—RESIDENCE AMONG THE ESKIMOS 1864 TO 1869.*

PREPARATORY LABORS.—PAPER BEFORE THE AMERICAN GEOGRAPHICAL SOCIETY.—FROBISHER RELICS SENT TO LONDON AND TO THE SMITHSONIAN.—LECTURES.—PLANS FOR THE NEW VOYAGE.—SAILING OF THE “MONTICELLO.”—LANDING AT WHALE POINT.—FIRST INTERCOURSE WITH THE NATIVES.—FEASTING.—ANKOOTING.—THE KEY-LOW-TIK.—WALRUS HUNT.—NEW YEAR'S DAY.—SEALING.—HALL'S FIRST PRIZE.—CAPTURE OF A WHALE.—WINTER QUARTERS AT FORT HOPE.—HALL'S DAILY LIFE.—AUORAS.—REFRACTION AND PARHELIA.—NATIVE MAPPING.—UNSUCCESSFUL ADVANCE WESTWARD.—FRANKLIN RELICS.—JOURNEY TO CAPE WEYNTON.—JOURNEY TO FURY AND HECLA STRAITS.—A MUTINEER.—JOURNEY TO IGLOOLIK.—VISIT TO KING WILLIAM'S LAND.—FRANKLIN RELICS.—CAPTURE OF THE THIRD WHALE.—RETURN TO THE UNITED STATES.

PREPARATORY LABORS (1862-64).

HALL'S preparations for his second Expedition occupied a period of two years. The labors of those years, by showing the successful results of his first voyage, and by the interest created through the publication of his “Arctic Researches,” secured his second outfit. The residence among the Eskimos which followed gave him a longer Arctic experience than that of any other explorer.

The purpose of the first voyage, defeated, as has been shown, by the loss of his boat, was but strengthened by defeat. Of this he gave

* The Narrative of this Expedition, and that of Hall's third,—the “North Polar Expedition of 1871,”—have been drawn up from the material placed before the author while on duty on this subject at the U. S. Naval Observatory. To the official records and correspondence of these Expeditions then furnished, favorable opportunities offered themselves for supplementing some of Hall's Journals by the receipt of his correspondence with his choice friends, Mr. Henry Grinnell, Mr. J. C. Brevoort, of New York, and Captain Budington and Mr. J. J. Copp, of New London, Conn. For the use of some of the illustrations acknowledgments are due to Prof. Baird of the Smithsonian, and Dr. E. Bessels.

renewed proof, before reaching the United States, by a telegram from St. Johns, Newfoundland—a dispatch which began with the words “I am bound for the States to *renew voyage*,” and which reads throughout more like news from an excursionist than from one who had been fighting his way through two Arctic winters. The fortitude into which he had been disciplined will be seen to have shown itself steadily through the two succeeding years of working and waiting.

On his arrival in New London, placing the Eskimos under the care of Captain Budington, he made a short visit to Cincinnati. While there his letters evinced much concern as to the opinions which the English people might form from the reports in the press of a hasty impression received from him that he had probably determined the fate of the two boats’ crews of Franklin’s Expedition. He had been led into this error by a party of Sekoselar Innuits, but promptly corrected it in the columns of the New York press, and, afterwards, more fully in a paper read before the American Geographical Society, and in the “Arctic Researches.” His apprehensions were that before the first corrections could reach England, the error would prejudice the English against the genuineness of the discoveries he had been making in the region visited. The apprehension proved to have been groundless. It however induced Hall to decline lecturing in Cincinnati, and to entertain a new idea in regard to the proper disposition of the relics.

He naturally set a value on his late explorations, and had reason to suppose they would interest the English people. He believed that the account given by Frobisher himself was so indefinite that, for nearly three hundred years, the civilized world had been in doubt of the precise localities. Up to the time of this visit of 1861 no opportunity had been embraced for identifying them, or for confirming other accounts which Frobisher had given. The Admiralty chart of 1853, and that furnished by the volume of DeHaven’s Expedition, still had upon them the so-called “Strait,” which was supposed to be a passage westward to the further part of Hudson’s Bay; but navigators had always chosen Hudson’s Straits in passing to and from that bay. Had any one attempted the passage through what was laid down on their charts as Frobisher’s Strait, they must have failed to pass through. He had

reason for desiring to prove the genuineness of his discoveries, and he expressed a wish to place his proofs before a committee that might be appointed in London to examine his notes, his relics, and himself.



MARTINUS FROBISHERUS EQUES AURATUS.

From "The Three Voyages of Frobisher," edited by the late Admiral Collinson, R. N.

Sir Martin's name was that of one of the first Englishmen to sail in quest of the passage, and it was one of no less fame under Drake and Howard, for in 1588 he was knighted for service under the High Admiral Howard against the Armada.

Hall's enthusiasm prompted him to say that the age of his relics, and the remarkable circumstances attending them, stamped them as worthy gifts for Queen Victoria. Barrow had taught him that the expeditions of Sir Martin were among the favorite objects of Elizabeth, who had shown her favor by throwing around his neck a chain of gold. Conferring, however, with Mr. Grinnell, in New York, he decided to send the relics out to England, in place of exhausting his own means and delaying his plans by a visit to London.

At a meeting of the American Geographical Society of New York, introduced by Mr. Grinnell, he made a report, which will be found noted in their "Proceedings" of the year, under the title of "An Abstract of a Paper on some Arctic Discoveries." In this paper, after referring to his statements before the Society made two years previously, he re-stated in full the original purpose of his late voyage to visit King William's Land and Boothia, and there spend two years, if needed, in gathering materials for concluding in a more satisfactory way the history of Franklin's Expedition; to recover the logs of the ships "Erebus" and "Terror," with all other manuscripts belonging to that Expedition; and especially to rescue some lone survivor or survivors, that peradventure might be found living with the Eskimos. He then gave an account of Messrs. Williams and Haven's generously free conveyance to Northumberland Inlet, of himself and his Eskimo companion, Kud-la-go, with his boat, provisions, and stores; of his boat being wrecked; and of his long residence with the natives, during which he had ingratiated himself with them, adopting their style of dress, living in their snow-huts, and feeding on their raw whale-skin, walrus, and seal-meat.

With some exultation, he said that in September, 1861, he had landed on an island which the Innuits and their ancestors from time immemorial had called *Kod-lu-Narn*, or White Man's Island, from the tradition that strangers had lived there and tried to escape from it; that on this island he had found remains of stone houses, coal, iron, and glass, all covered with the moss of ages; and that he had visited every accessible place named by the Eskimos as connected with the fate of the strangers there, "many, many years ago." He added his

convictions that he had thus been the first to revisit the precise localities of Frobisher's expeditions, quoting from Hakluyt and other works, in which the materials taken out by Frobisher for the erection of *stone houses* and everything necessary for the colony of one hundred men are detailed; and he exhibited the specimens which he had brought from the ruins, asking the Geographical Society to inspect them rigidly in evidence for or against his statements.

He then showed that during his two years' northern residence he had explored over one thousand miles of coast, making as careful a survey as his means and instruments permitted, and proving that the water which had for three centuries been called Frobisher's Strait was a wide bay, adding, "Inasmuch as I have failed in the great object for which I went out, it is my intention to try again in the following spring."

Donations of the relics were sent to the Smithsonian Institution, and a part of the geological collections presented to the New York Lyceum of Natural History was the subject of Reports by Mr. R. P. Stevens and Mr. Thomas Eggleston. A discussion of another part of the collection by Professor Emerson of Amherst College, endorsed by Professor White of the United States Geological Survey of the Territories, forms Appendix 3 of the volume of "Hall's Second Arctic Expedition," published by the United States Senate in 1879. With the relics sent to the Royal Geographical Society was a carefully prepared outline sketch of the bay, and three diagram maps, one of them the Countess of Warwicke Sound.

Commander Becher, R.N., of the Admiralty, who had written elaborately of these old voyages, wrote to Hall, "I have no doubt of your relics being those left by Frobisher's party." His correspondence abroad produced also a valuable incidental result, the issue of a new volume of the "Hakluyt Series," in which the late Admiral Collinson, R.N., the well-known Arctic explorer, of the relief ship "Enterprise" (see Table II., page 29), has given a rare edition of the Frobisher voyages, cordially dedicating it "to Henry Grinnell, of New York, as a tribute of respect and admiration, not only for his conduct and generous co-operation in the search for Sir John Franklin and his com-

panions, but for the interest he had shown in, and the aid he had afforded to, Polar exploration in the present day."

The Admiral gives an extended catalogue of Hall's relics, which were to be deposited in London with the Franklin relics brought back by Rae and McClintock. Captain Becher courteously forwarded also to Hall the charts, which he might find useful.

He now entered on a course of lectures for securing aid toward the Second Expedition, and for his own support and that of the Eskimos, delivering these to large audiences in Providence, Norwich, Hartford, New Haven, Hudson, Elmira, and other cities; exhibiting on his maps the routes of the old voyagers, Frobisher, Davis, Baffin, and others, and his own recent explorations. The Eskimo family were always objects of much interest, Too-koo-litoo showing an unexpected knowledge of the geography of her country, and reminding Arctic students of the native woman, I-lig-li-uk, and her chart drawn for Parry. The lecturer could not claim polish or ease of oratory, but secured close attention by the tact and enthusiasm of these conversational discussions. His friends regretted that under its general rule against pay lectures, the Smithsonian Institution could not tender the audience-room to which Kane and Hayes had been invited, for he had hoped to interest the officers of the government at Washington in an appropriation by Congress for a new voyage. The proceeds of his lectures secured but little beyond the necessary expenses; they made friends for him, but as to pecuniary gain, he "was worse off than when he started out." Yet he pushed forward his plans. To the credit of his sincerity and intelligent thoughtfulness, it should be noted that he kept his mind under the influence of the counsels and the example of leaders who had themselves passed to success only through disheartening trials. In his private note-books are to be found, underscored almost word by word, such maxims as these: "Our greatest glory consists not in falling, but in rising every time we fall." "The question is not the number of facts a man knows, but how much of a fact he is himself." He remembered that Henry, the revered Secretary of the Smithsonian, had said he had "freely given to the world the results of his labors, expecting only in return to enjoy the consciousness of

having added to the sum of human happiness." And Smithson had written, "Every man is a valuable member of society, who, by his observations, researches, and experiments, procures knowledge for men."

NEW PLANS.

On the 17th of March, 1863, an anxiously-awaited conference was held with Mr. Grinnell, and Mr. R. H. Chapell, of the house of Williams and Haven, New London, at which Hall presented the notes for his Second Expedition, the chief of which included the following ideas, under the head of his

"Proposed Expedition to Boothia and King William's Land, for the final determination of all the mysterious matters relative to Sir John Franklin's Expedition."

A vessel of about two hundred tons to be furnished and provisioned for two years and six months; the same to be under Hall's command. The vessel to be fitted out for whaling, the object being to have the whole expense of the Expedition paid by the proceeds of whalebone and oil; to go on or before the 1st of June of the present year, and make direct for the north side near the entrance of Frobisher's Bay; there to take aboard three or four Eskimos, with their wives, also sledges and dogs; then to make for Hudson's Strait; thence to Hudson's Bay, west side, south to Southampton Island; thence up the channel of Sir Thomas Rowe's Welcome to Repulse Bay.

If whales were found on the way, to secure as many as possible, yet no further delay to be allowed than would admit of getting into Repulse Bay by or on the 1st of September of the same year as starting.

If it were found advisable under certain contingencies for the vessel to proceed at once to other whale-grounds than that of Repulse Bay, she must do so after having landed him and his party and outfit for land service, to wit, for his expedition from Repulse Bay to King William's Land.

A cheap, portable frame house was to be constructed in the States, and landed at the Bay, to be used there for storing provisions therein, and also as a residence.

By establishing headquarters at the bay, having there a whale-boat strongly constructed, and having there also Frobisher Bay Eskimos, there need be no hinderance to the force employed on the vessel from prosecuting to the fullest extent their whaling business.

The whole expense of the Expedition to be paid from the proceeds of the whaling branch, providing the amount warrants it.

Mr. Grinnell and Mr. Chapell approved the ideas of this plan, but at the date named, during the reverses of the war not yet ended, it was no time for either commercial house to take the risks of success in whaling pursuits. Mr. Grinnell had already expended on Arctic expeditions between one hundred thousand and one hundred and fifty thousand dollars, and had met with recent losses.

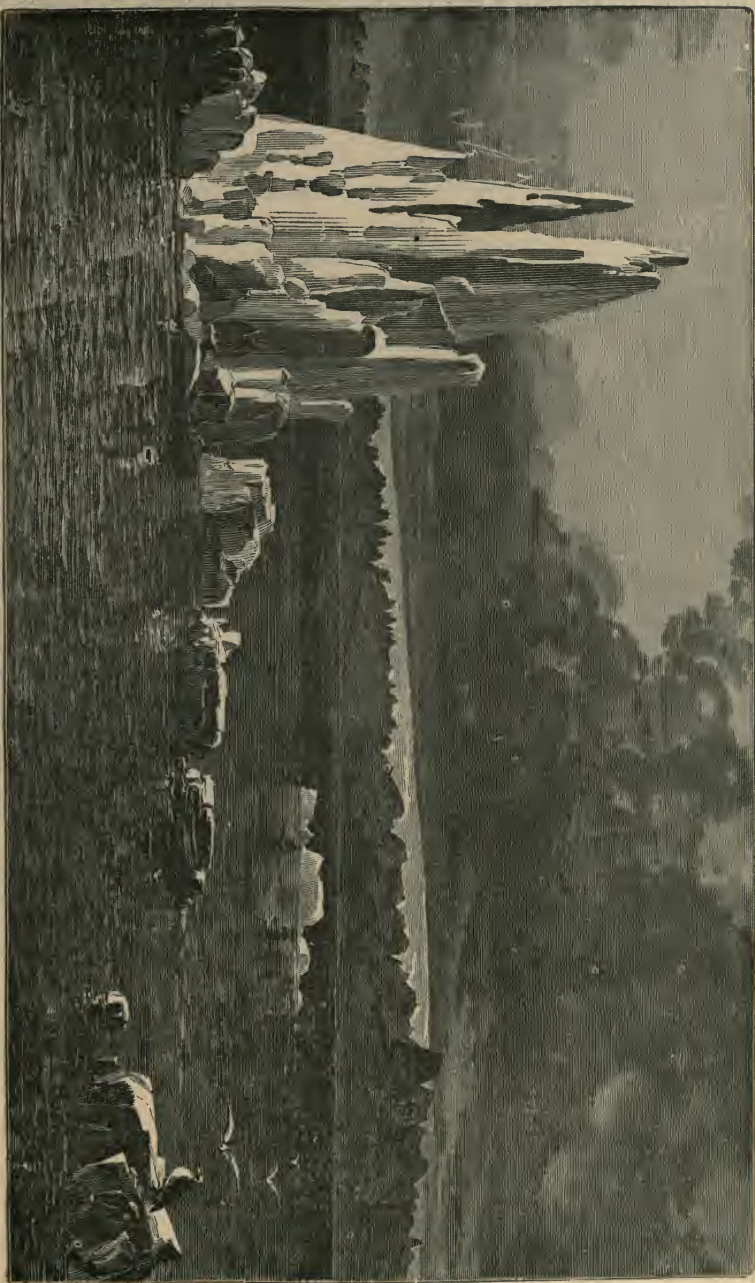
After the study of other plans, involving essentially the same ideas of the employment of a ship and of companions on his proposed journey, and finding each of these impracticable for want of funds, Hall accepted a proposition from Mr. Chapell to go out on a free passage in a whaler with his two Eskimo friends only.

HALL SAILING IN THE "MONTICELLO."

July 1, 1864, the "Monticello," a whaler of three hundred and fifty-six tons register, commanded by Captain E. A. Chapel of Hudson, New York, sailed from New London, accompanied by the tender "Helen F.," of one hundred tons. Hall's home correspondence was closed on board by his acknowledgments to Messrs. Harpers, his publishers; forwarding to them his last corrected proof-sheets of the volume of the "Researches." Arriving at St. Johns, he received from U. S. Consul Leach and other citizens many tokens of kindness and assistance to his outfit. The "Monticello" sailed again on the 18th.

On the 28th Hudson's Straits were entered, and the ship shaped her course for Resolution Island. Her delay in passing through much floating ice was available for taking the bearings of the prominent headlands along the shores of the old Meta Incognita of Queen Elizabeth; across the strait lay the old Frobisher region.

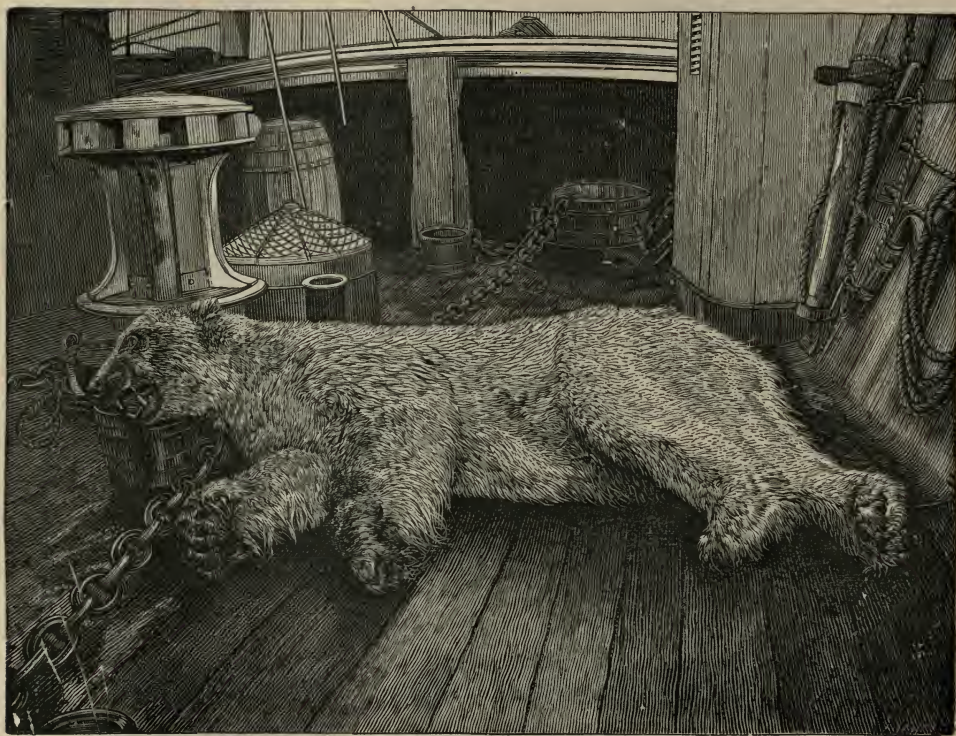
The ship's log of each day for a time showed much the same varying



FROISHER BAY AND GRINNELL GLACIER.

From "Hall's Arctic Researches." Harper Brothers.

record; for a few hours she moved forward under a favorable breeze, or else it was tack, tack, the wind dead ahead; she bored her way through the pack, or meeting an impassable barrier made fast to an iceberg. August 1, her iron-plated bow struck so heavily on the hummocks, that her crew were in waiting to jump from her for their lives. Walruses were more than once seen basking in the ice; undisturbed,



POLAR OF HUDSON'S STRAIT.

they raised their ferocious heads as the ship swept by, and then rolled over into the sea.

August 3. —A huge Polar was captured. On the chase of this animal by a boat's crew, Bruin soon scented his pursuers, and when a mile off, he shuffled to and fro on the ice, shook his head, showed his tusks and roared furiously at them; then, dropping stern foremost into the sea, began a swim at the rate of fully six knots. Ebierbing's rifle, at the distance of fifty yards, brought him a lifeless carcass on the water,

and in thirty minutes from the beginning of the chase it was on board ship. Some of the measurements of *Ninoo* No. 1 were:—

Estimated weight	1,100 lbs.
Length from snout to end of tail	8 ft. 5½ in.
Circumference of the middle	7 ft. 4 in.
Length of front teeth, each	7 in.

The Eskimo had scarcely finished cutting up this Polar, when he was off for a second one which was seen asleep some two miles from the ship, and he secured the prize after twelve shots, the twelfth piercing the brain. The number of shots is not unusual, a bear sometimes seeming to have the fabled lives of the cat.

Polar No. 1 was immensely fat, his paunch was empty. The skin, the fat, and the meat were saved. The meat was eaten and partially relished by the crew; the inwards, except their fat covering, were thrown away, as unhealthful. From the two bears over seventy gallons of good oil were secured; in the paunch of the second bear were found about six gallons of seal oil.

The ship's course across the bay was ended on the 20th by her anchoring at Depot Island, lat. 63° 47' N. lon. 89° 51' W. The English name of the island had been given to it by Captain Chapel on a former voyage, the Eskimo name being *Pik-e-u-la*.

UNFORTUNATE LANDINGS.

But the landing here was again a grievous disappointment to the explorer. He had hoped to do some good surveying work on Marble Island, the original destination of the two ships, and perhaps to discover the remains of the most unfortunate Expedition, under Knight and Barlow, which perished there in 1719. Mate Chester, who accompanied the party to the island, estimated the weight of Hall's boat and outfit at only one thousand four hundred pounds. It was twenty-eight feet long, with a five feet ten inch beam, and of but twenty-six inches depth, when fully loaded.

The whaler left the harbor on her first cruise of the season, and Hall began his five years' Arctic life; a tent was erected and some observations made for position. The game secured on the 22d footed up nine petularks and one wild goose.

He had now the offer of an assistant in a Mr. Rudolph, one of the crew of a whaler which had come in; and as the man had spent one winter among the Innuits, was recommended by the mate of the ship, and declared himself ready to go on the proposed journey, two or three years inland, he was accepted after being fully told the darkest side of the experience he might be called to pass through. On the 29th the tender "Helen F." sailed with the party of four for Wager River, and the next day the captain landed at "Whale Point," which he believed on the river; by Hall's observations afterwards it proved to be forty miles south of the point of the captain's reckoning. This was a second and yet more grievous disappointment, and it caused the loss of a whole year to the objects in view; for, had the landing been on the river, the journey to Repulse Bay could have been easily made before the season closed, and winter quarters secured there with preparations for the spring journey. But there was no correcting the error. Reaching a little harbor, Hall and Rudolph went waist-deep in the water to haul the boat "Sylvia" ashore, and a cache was soon made for stores. The position of this "first encampment" was lat. $64^{\circ} 35' N.$, lon. $87^{\circ} 33' W.$

A single white man as leader, with a companion who soon proved useless as an assistant, a desolate region, and winter almost at hand! But here was a man of brave heart and of experience. Up the shallow Welcome of Sir Thomas Rowe the little craft now coasted, piloted by the Eskimo, Ebierbing (Joe), on whom the party were for a long season to be dependent for their steersman as well as hunter. Hall wrote to Chapel that American whalers who had opened up the fishing within the currents and eddies of the Welcome must be good navigators; for the "Sylvia," drawing about eighteen inches, often touched on her course, and no channel could be found. After an advance of but a few miles, Joe sighted a *tupik* (skin-tent), and soon afterward a native came toward the boat, gun in hand. A sharp pull, and a leap from the bow, and Hall had made his first new friend in *Ouela*, a native more than once to be hereafter referred to in the story of this and of later voyages.

QUESTIONS AS TO FRANKLIN.

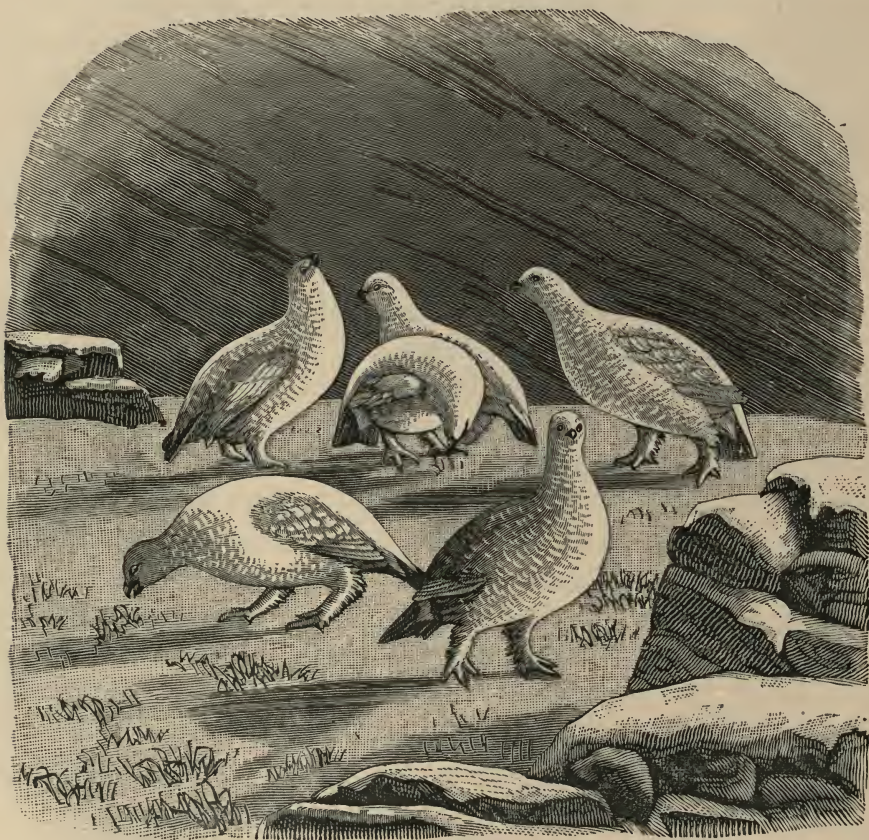
At a tenting-place (Noo-wook) close at hand, Ou-e-la, called by the whalers Albert, Ar-too-a (their Angeko), called Frank, and Ar-mou, the *wolf*, and their people, were at once questioned, through Too-koo-litoo, about Franklin's lost men. Their story was, that years ago there were two ships lost near Neit-chi-lle, and that a great many Kod-lu-nas died. Some starved, and some were frozen to death; but there were four that did not die. With the enthusiastic desire to catch what he could of such news, Hall as promptly accepted this, and his confidence was strengthened by the natives pointing out on the Admiralty chart not only Repulse Bay, but the track of Dr. Rae, whom they professed to have seen. Ar-too-a gave him an account of Ou-lig-buck, one of Rae's interpreters, and of his wounds received in the hunt, his story corresponding with the record given by Rae himself in his expedition of 1846-47.

All the natives advised Hall that he could not reach Repulse Bay at that late season of the year; that he would not find any Innuits there, as they always spent the winter elsewhere to kill the seal and walrus; and that if he could get there, he would be too late to kill any Tuk-too. They would go themselves to the bay next season, and then to Neit-chi-lle, and if he would spend the winter at Noo-wook, they would give him all the Tuk-too, walrus, seal, and bear-meat needed, reindeer furs, and assistance. He decided of necessity to stay with them.

The 15th of September was a day of gale. The *Welcome* was lashed into fury by the north wind, which drove far inland everything like game. The moon was full at 9h. 9m. Greenwich time. On the going down of the sea, Hall and his new man Friday, with Ar-too-a and Joe, went out in swift pursuit of an ook-gook (*Phoca barbata*) which had been seen drifting down, seemingly asleep; but the cautious seal waked at the sound of the oars and disappeared.

With the rapid change of the season the nights began to be cold, ice was forming on the fresh-water lakes, and there were signs of an approaching snow-storm. A sheltered place for the tupiks became a

necessity. On the 18th Hall's journal says: "It has been moving-day with us, and an interesting picture might have been seen,—the Innuits and the two Kod-lu-nas, with packs on our backs, tramping along towards our destined new home. Old Mother Ook-bar-loo had for her



SNOW-PARTRIDGES.

pack a monstrous roll of reindeer-skins, which was topped with kettles and pans and various little instruments used by Innuits in their domestic affairs, while in her hand she carried spears and poles and other things that need not be mentioned here. Ar-too-a had for his pack his tent and pole, his gun and et ceteras in his hand. His wife had a huge roll of reindeer-skins and other things, much of the character of Ook-bar-loo's. The dogs had saddle-bags, and topping them were

pannikins and such varied things as are always to be found in Inuit use. Ebierbing had for his pack our tent and some five or six tent-poles, while in his hands he carried his gun. Charley Rudolph had a large roll of reindeer-skins, carrying also numerous tent-



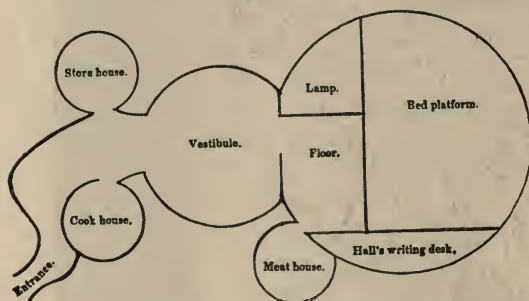
HALT'S FIRST IGLOO.

poles. Too-koo-litoo had deerskins, and in her hands various things. I carried on my shoulder two rifles and one gun, each in covers; under one arm my compass tripod, and in one hand my little basket, which held my pet Ward chronometer, and in the other my trunk of instruments."

The Innuits then brought out from their deposits the reindeer-skins *cached* in the summer. The weight of these, borne by the women, was as much as one hundred pounds to each. At their distribution the women were allowed to choose the best.

The ground was now covered with snow, the lakes bore a man's weight, and the heavy weather on the coast drove the game inland. Flocks of the *Ptarmigan* (snow-partridges) were found after each snowfall. In midwinter, at a distance of ten feet, they are scarcely distinguishable from the snow.

By the help of Ou-e-la, Armou, and Joe, Hall established himself in his first winter quarters. He says of his igloo, of ten feet only in



GROUND-PLAN OF HALL'S FIRST IGLOO.

diameter, that his house was a building without a corner and without props or braces; the wall, roof, and door a unity, yet so strong as to defy the power of the fiercest Arctic gales. Two months afterward he wrote: "I exchanged tent for snow-

house, and have been all the time as comfortable as I ever have been in my life. You would be quite interested in taking a walk through my winter quarters; one main *igloo* for myself and Eskimo friends, and three others, all joined to the main, for storehouses. A low, crooked passage-way of fifty feet in length leads into our dwelling."

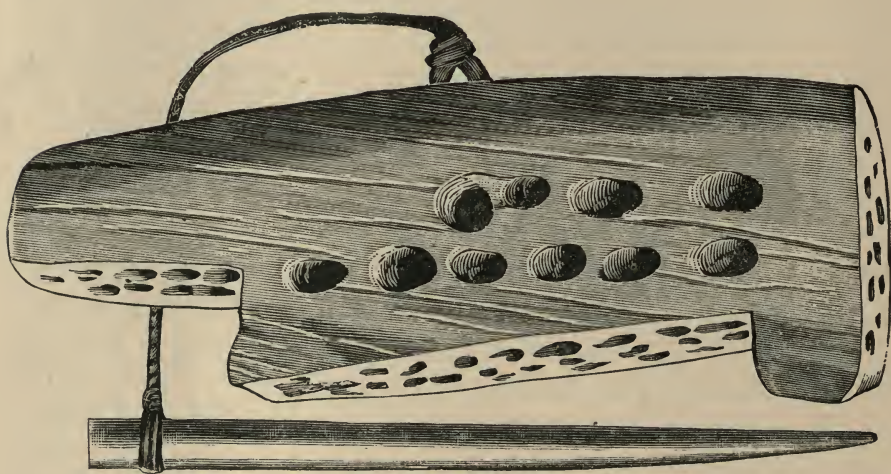
From this date until near the first day of the year following, his supplies of food and his visits and intercourse with the natives continued to be without serious discomfort. His experience, however, even of this first season began to correct some of the impressions of the qualities of the Eskimos, on whom, in his first volume, he frequently bestows the epithets "noble and generous," "simple and freehearted." In common with all Arctic voyagers he could not, indeed, have failed to be offended at the outset by the constant witness of their uncleanly habits, and had written in his notes, two years before, that

when a white man for the first time enters a tupik, he is nauseated with everything he sees and smells — even disgusted with the looks of the natives. He would see a company of what you would call a dirty set of human beings, mixed up among masses of nasty, uneatable flesh, skins, blood, and bones, scattered all around; and, hanging over a long, low flame, the *Oo-koo-sin* (stone-kettle) black with soot and oil, filled with black meat, swimming in a smoking fluid, as if made by boiling down the dirty scrapings of the butcher's stall, while the dishes out of which the soup is taken would turn his stomach, especially when he saw the dogs wash them out with their tongues before he used them. He had added to this that there was no alternative but to submit to their customs and be one of them. On this second voyage his first patient was one from whose face, by persuasion, he sponged off, with soap and water, a thick coat of primitive soil.

His companionship at the feasts was now not more satisfactory, as regards these native habits. At a general invitation, October 29, the entertainment was held in two connected igloos. In one, the women sat Turk-fashion on a snow-bench bed, around a huge pile of raw frozen venison and *tood-noo* (reindeer fat); in the other, the men crowded close together, the snow-walls of both echoing with the Babel of tongues and laughter. To begin the feast, a large piece of venison, held between the teeth of one of the parties, was sawed off by the knife close to his nose, stuffing his mouth full; the main piece was then passed around for the same process by each, and the *tood-noo* followed suit. Then from a dish of reindeer heads and necks, boiled in the blood, each guest took a sup till all was gone; and when the women of the igloo had licked the pot clean, and stuffed the children to suffocation, each one scraped the grease from his face into his mouth, and licked his fingers. A self-adaptation to such habits, prolonged, too, through the period of the five years, seems explicable only in connection with Hall's own statement, that to keep his health and accomplish anything, he *must* live like this people. He exchanged frequent visits, and soon ate, drank, and slept as did the natives, and he wrote that the stronger the venison, even if putrid, the better he relished it. The immense quantity of food swallowed by the Innuits at

the feasts, which usually follow their privations of the season, were no matters of surprise. Like all rude tribes, they were provident during the open season, but in a time of enjoyment excessively and thoughtlessly wasteful. In the month of September, Hall thought they had several hundred reindeer *cached* within a circle of twenty miles in diameter, but before December closed scarcity had begun to set in.

More than one occasion was found for the superstitious business of An-koo-ting. On one of these the An-ge-ko (Artooa) entered the crowded igloo with three men and an old woman, asking immediately that



GAME OF CUP AND BALL.

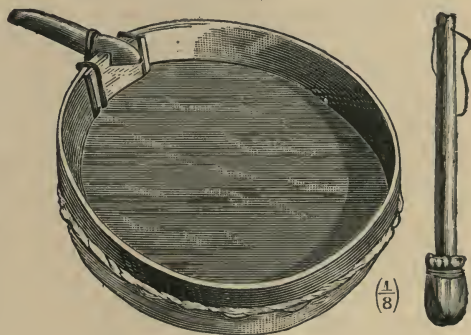
(Learned probably from the Whalers.)—Smithsonian Institution.

the light at the table where Hall was seated to take notes, should be put out; the wick of the lamp was then thumbed down, giving just light enough to make the scene gloomy and cold. Then taking off his boots and standing on the bed-place, he made a speech of about ten minutes, his hoarse voice at times shaking the dome, and contrasting strongly with the musical voice of the women and with Joe's crying out from time to time, *atee, atee, good, good, go on*. Among the antics he displayed, he grappled with two of the strongest Innuits, throwing them with seemingly supernatural strength. The chant was low and monotonous, while the grim, swarthy faces of the audience, spectrally illuminated by fitful beams of the lamp, and their dark bodies swaying awk-

wardly to and fro and keeping time with the barbarous music, made up a wild and unearthly scene. Not one of the natives were free from the influence of the rite, Joe and Hannah not excepted. The tribe showed the natural love of amusement, — checkers, dominoes, and the cup and ball being their favorite games.

A serio-comic diversion was their performance on the Key-low-tik, the only musical instrument found among them. The drum is made of a piece of deerskin stretched over a hoop made of wood or bone from the fin of a whale, by the use of a strong braided cord of sinew passed around a groove on the outside. The instrument weighs about four pounds. The Ken-toon or wooden drumstick is ten inches long, and three in diameter.

“When the Key-low-tik is played the performer holds the drum handle in the left hand, and strikes the edge of the rim opposite to that over which the skin is stretched. He holds the drum in different positions, but keeps it in a constant fan-like



KEY-LOW-TIK AND KEN-TOON.

motion by his hand and by the blows of the *Ken-toon*, struck alternately on the opposite sides of the edge. Skilfully keeping the drum vibrating on the handle, he accompanies this with grotesque motions of the body, and at intervals with a song, while the women keep up their own Innuited songs, one after another, through the whole performance.

At the first exhibition which Hall witnessed some twenty-five men, women, and children — all who could leave home — assembled to see the skill of the performers who would try the newly-finished instrument. As usual the women sat on the platform, Turk fashion; the men, behind them, with extended legs. The women were gayly dressed. They wore on each side the face an enormous pig-tail, made by wrapping their hair on a small wooden roller a foot in length, strips of reindeer fur being wrapped with the hair. These were black and white for

those who had sons, and black only for those who had none. Shining ornaments were worn on the head, and on the breast they had Masonic-like aprons, the groundwork of which was of a flaming red color, ornamented with glass beads of many colors. The women thus presented a pleasing contrast with the dark visages of the men in the background; while their naked infants were playing here and there in a mother's lap or peering out from their nestling-place in the hood.

Ook-bar-loo, Jr., was the first performer. This young man was a son of Ever-at, named in Parry's narrative of his second voyage as helping to draw one of his charts. When he tired, the women struck up a song for the second performer; then stripping off their jackets to be naked from their loins up, the men alternately dealt each other's arms such fearful blows that Hall thought their very bones must be broken, and seemed to feel his own shoulders ache. The one who had played the *Key-low-tik* the longer, now struck his blows without mittens, and Ook-bar-loo ere long gave signs of surrender. The times varied from ten to thirteen minutes each.

Ar-too-a, Ar-mou, and Ou-e-la followed as performers at short intervals, one of them making as high as one hundred and sixty strokes in a minute with the *Ken-toon*; when Nu-ker-zhoo, getting his hand under the *Key-low-tik*, and dealing rapid blows first on one edge and then on the other, by this jugglery kept it vibrating in the air, and brought out from it the same sounds as when played in the usual way. Hall, being then called out by the house, tried his hand, but in less than three minutes the *Key-low-tik* was on the floor, his arm and wrist aching from the weight, and the whole igloo convulsed with laughter. Joe was called for, but was too weak from recent sickness to perform. Before this part of the exhibition closed, the performers showed up the differences in playing as practised by the neighboring tribes.

The meeting now changed its character. Ook-bar-loo, when he resumed playing, instantly extinguished the lights, leaving only the dim moon to creep in through the fresh-water ice window of the igloo. He then commenced his talk with the spirits, accompanied by clapping of hands, jumping up and down, sideways and forward, and then backing out from the igloo and returning. During all this *an-koo-ting* one and

another of the audience kept repeating "words which seemed not unlike those of a penitent giving in his experience at a revival meeting."

The entry into new igloos in November was celebrated by like performances. The An-ge-ko made use of three walrus spears, one of which he thrust into the wall of the snow-house, and then having a

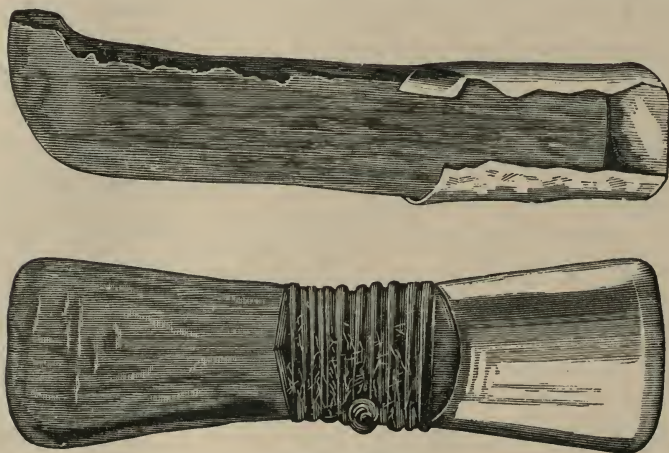


PLAYING THE KEY-LOW-TIK.

wrestling match with four men on the outside, and coming again into the central igloo, he commanded the lamps to be relit, and showed the points of his spear covered with blood. This he licked off and then began his incantations, addressing first, with head erect, the great Power above, and then with his head on the floor the spirit below.

In a time of sickness, in which Hall suffered from the breaking out of boils, he had been prevailed on to be himself *an-koo-ted*, and had consented to obey the An-ge-ko's order that he should never again wear

certain garments, but should burn them. So far as a consenting to like seemingly harmless decrees his notes show that he subjected himself to their wishes. When he had expressed a desire for a change of food from walrus-meat, he received the solid frozen head and neck of a reindeer; but as to put this on the floor, or among the other kinds of meat on the platform would have prevented the catching of another walrus throughout the year, or, perhaps, of taking any more, he had to cut this up, watching closely that every chip flew westward and not one on the floor, and he then ate it soaked in rancid and stinking seal-oil, Innuît customs



SEK-KOONS.

Skin-scrapers, half size, deposited at the Smithsonian.

forbidding the use of any other. The neck only could be used, not the head until after the walrus season; still he said that he had gotten so far along in Innuît taste as to like this very much; but a very short time after, on receiving seasonable supplies from the whaling ship, he wrote: "What a glorious supper we had to-night. A change now and then in his food is what a white man likes. Even an Innuît loves civilization food."

A more pleasing experience was that of observing the Innuît preparation of the reindeer skins for dresses and bed-coverings; in this the women assisted the men. The processes were, first to scrape the skin by an instrument called sek-koon, a rough tool about six inches long including the handle, made of a peculiar kind of whet or oil stone,

or else of a musk-ox or reindeer bone, or of sheet-iron. The second step is to dry the skins thoroughly; the third to scrape again with sek-koons, taking off every bit of the flesh; the fourth to wet the flesh side and wrap it up for thirty minutes, and then again scrape with the sek-koon; which last operation is followed by chewing the skin all over, and again scraping and cross-scraping with the instrument. These laborious processes Hall describes as resulting "in the breaking of the skin, making the stiff hide soft-finished like the chamois-skin." The whole work is often completed within an hour.

The following account of a walrus-hunt is one of several like notices, largely condensed from the journals:—

At eight in the morning Hall left his igloo, leading by a long trace-line one of the large dogs which were to be employed in dragging the walrus home; several other dogs were led by the Innuits, but by far the larger number were allowed to run loose, preceding or following the hunters. The distance to the walrus-grounds had been for some time constantly increasing as the land-floe widened, and the animals, accordingly, shifted their feeding-grounds to the new ice or to the fissures near its edge. Having crossed the half-mile belt of very rough ice near the coast, and advanced about six miles, Hall came to this edge. A breeze from the north was drawing the floe to the southward at the speed of a quick walk, and as it pressed heavily on the edge of the fixed ice, the noise was so terrible that he was at times forced to draw himself back several paces from the point to which he had ventured. For scores of miles to the north and south, the drifting floe was grinding its uneven face against the firm but jagged front on which he stood. Mounting a high ridge, he saw, as far as the eye could reach seaward and up and down the Welcome, a boundless field slowly moving onward toward the south, but crushing to atoms miles and miles of massive ice; now rearing up mountains on mountains, now ploughing up acres into high ridges.

Ou-e-la, who had joined him, was unable to reach a large walrus, which rose in a small water space five fathoms off, for the "squeezed, rolling, crouching mass" was working between the floes. He gave a quick signal to those on the drifting floe, and Ar-mou and Ar-too-a ran

rapidly toward the walrus; but just as Ar-mou had his harpoon raised, the animal disappeared in the water. Hall and Ou-e-la then directed their steps toward the loose pack which the others had already gained, to reach which the sharp eye of the Innuït quickly discovered the only possible crossing. A quick run, a few steps over sludge and powdered ice, a leap from this tumbling block to that one, and a final leap to the driving floe, brought the two safely over. Walruses could now be seen in every direction; some butting up ice fragments from the solid main; some with their heads through the butted holes; some with a large part of the body above the ice. The hunters were busily at work. In one direction two Innuïts were under full run for the same blowing walrus, the dogs running around them. All at once these hunters stopped, for the animal had taken the alarm and gone down. In another direction an excited group were seen, one throwing the lance, another holding on a line, one jumping this way and another that, — for a walrus appeared to be a secured prize. With some difficulty Hall gained this spot, but found only one Innuït remaining, while the reddened ice and the hole showed a severe conflict. Shoo-she-ark-nook had harpooned a very large walrus, and he and Ebierbing (Joe) had lanced it until it was almost dead. The harpoon, however, slipped out and the animal escaped, Joe losing his lance-head.

An extensive floe of the "walrusing ice" was now seen shooting over the ice on which they stood, and advancing from the north at the speed of a moderate walk; its thickness was two inches, the same as that on which they stood. They were two miles from the land-floe, upon ice which bent like leather at every step, often yielding two or three inches without a fracture, and it would not do to remain at rest on such ice. They were compelled to be constantly in motion as the situation demanded.

Hall hastened to a second group of Innuïts, who were as busily occupied as the first, and in a few moments found himself pulling away with others on a line which was fast to a large walrus. After a few pulls, the half-killed animal came up in a flouncing, tumbling way. He was furiously mad, for he had not only been harpooned but lanced and lanced again and again, so that at every blow, quarts of thick dark blood were

thrown up, scattering itself about, painting the ice, the dogs, and the party with a crimson hue. Looking on the scene, Hall wrote:—



A WALRUS-HUNT.

“What a horrible-looking creature a walrus is, especially in the face! It looks wicked, detestably bad. Indeed, a devil could not have a more repulsive look to Turk or Christian. A hard death did this one die. He fought desperately, but steel and sinewy arms, under the control of

cool courageous hearts, finally conquered. As often as he came up to blow, he was met by the lance of the harpooner, who thrust it quick and deep into the heart and *churned* away until the walrus withdrew by diving under the ice and flippering away to the length of the line. Then, at each new appearance, he would fasten his long ivory tusk (one had been broken off, probably in some fight) upon the edge of the ice, and turning his eyes around would spend his fury on the first of his enemies who approached. He then again flippered back, and, as the

uplifted lance was poised, moved violently forward and upward, throwing forward his head with a circling sweep, as if to drive his tusk to the very heart of his assailant.



A WALRUS HEAD.

From the shipping-house of Williams & Haven,
New London.

“What a terrible blow a walrus can deal with his head and tusks! When he came up to breathe, which he did several times through different holes, resting with his tusk hooked on to the edge of the ice, at every breathing he expelled through his white-walled mouth a frightful stream of hot life-blood, and as the hungry dogs rushed up fearlessly to the very fountain whence the luscious, savory gore issued, the dying walrus quickly raised his head and struck it forward with tremendous

force, though to little purpose, as the dogs were too quick dodging the blows. Shoo-she-ark-nook at last cut a gash in the neck with his peloud (long knife) and thrust the point into the very marrow of the spine.”

A fresh opening was now made in the ice, and to this the carcass was towed. Then the line made fast to the tough skin on the nose was taken to the point of the hummock five fathoms distant, and back again through a hole in the same tough skin. With this purchase, five of the party pulled away on the line, gradually sliding the carcass upon the ice. It weighed about two thousand two hundred pounds.

This done, each Innuït sprang to the task of cutting open the carcass from head to tail, that it might cover as large an area as possible on the ice; yet the moment they commenced to haul up, the ice began to bend, and by the time the walrus was disembowelled, the water covered it six inches deep. He was now cut up, longitudinally, into three parts, without being skinned, and while this cutting was going on, the dogs acted like so many devils, and it was impossible, even with a spear, to keep them away from the blood and flesh. The backbone, the lights, and a small portion of the entrails only were thrown away. The edges of the longitudinal parts were then placed together by lines, to give each mass a rounded shape.

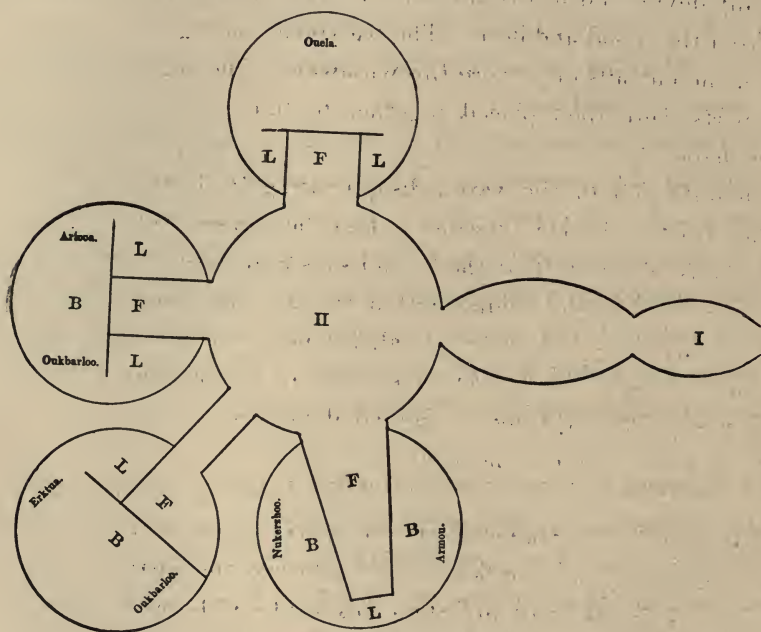
The paunch accidentally fell in the water, disappointing Hall, who was thinking of a clam-feast. He had expected to find the paunch well filled, as usual, with clams, clean of their shells, and says that rarely is any part of a shell larger than a dime found within the animal. Having often picked up a single shell close by a walrus-hole, he believed that the habit of the animal is to dig but one clam at a time, and then come up to blow and expel the shell. He wonders how it opens the clam so skilfully as not to fracture the shell.

The homeward journey was attended with the usual troubles in crossing fissures and regaining the land-floe, but at 4.30 P.M. the party reached the *igloos*. The dogs, divided into three teams, drew the walrus-rolls, which slid along over the rough ice more readily than a sled. The supply of provisions from this animal and from the reindeer deposits visited as occasion required, sufficed for Hall and his friends through the remainder of the year.

January 1, 1865, was a day of gale and drift; the day following Hall celebrated as New Year's Day. He hoisted the flag on his own igloo, and set a table for his native guests, twenty-five feet in length extending into the huts of Ouela, Ar-mou, and Nu-ker-zhoo. It was made of sea-chests, and its seats were snow-blocks cushioned with deerskins. He treated to vegetable and pemmican-soup, and sea-bread with coffee, isinglass jelly, and raisins for dessert; and his twenty-one grown persons, when rising from the table, put their hands over the places

where they had stowed the good things and cried out "Good, very good!" Giving notice through Joe that he had a speech to make, he endeavored to impress them with his confidence that he expected them to go with him next spring to Neit-chi-lle. Too-koo-litoo told him that they were all much pleased:

But within a few days he had reason to apprehend that his confidence rested on a frail basis, for he learned that the larger number of



NEW YEAR'S DAY IGLOO.

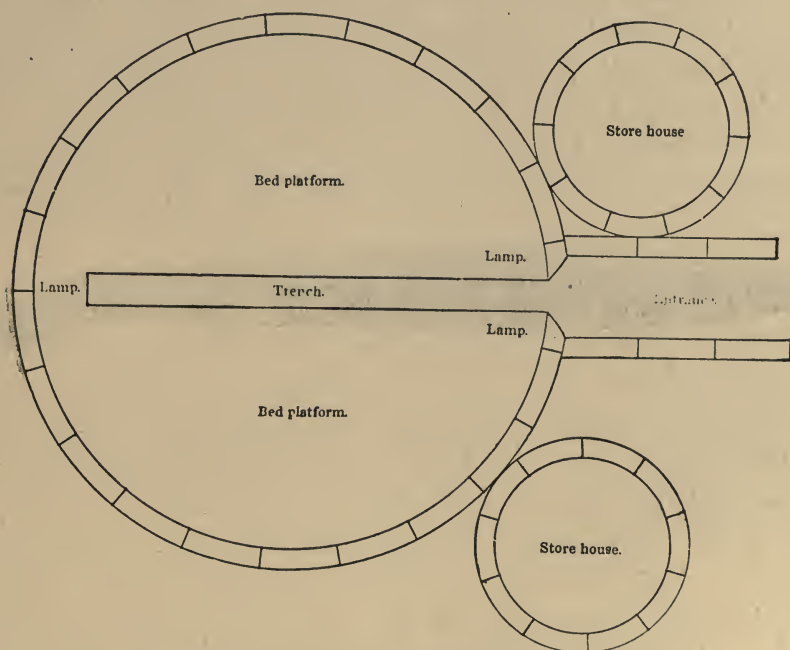
I, entrance; II, central igloo; B, bed platform; F, floor; L, lamp.

this people were expecting to visit again the whalers in the bay, and remain there too long to move forward seasonably with him in the spring. His journal says, "Innuits are a strange people to deal with; a white man to get along with them must have the patience of a Job." He must go down himself with a small party only to the ships.

Well supplied with venison and walrus-meat and blubber and reindeer furs for traffic, his party of seventeen left their igloos on three sledges, drawn by twenty-two dogs, the thermometer registering 72° below freezing point. Following mostly the southward track of a

former visiting party, they spent their first night in one of its old igloos, seventeen miles from Noo-wook, finding it necessary first to clear out the snow-drifts and build two smaller snow-huts.

The work upon these is thus described: "While one of Ou-e-la's wives shovelled out the snow-drift from the main hut, the other increased the thickness of its walls by banking up more snow on the outside. Hall's offered assistance to the women in this work of using



GROUND-PLAN OF IGLOO BUILT ON A JOURNEY.

the *por-kin* (snow-shovel) was refused by the husband. The drift being thrown out of the way, Ou-e-la then entered and made a bed platform on each side of the igloo, dividing two by a trench a foot in depth.

The women and children having then crowded in, made up the beds by spreading over the platforms their furred deerskins, and lit the three fire-lamps to melt snow for the thirsty. The men on entering carefully beat their jackets and *kodlin* (outside breeches), with their *arrow-tars*, to prevent the warmth of the igloo during the night from

melting the snow upon them ; for if it again froze upon them it would make the garments heavy as well as cold. This thorough beating required a full half hour. The temperature within the hut, under the influence of the lamps and of the crowd, quickly rose from 41°, but was again lowered by the venison in the trench, which, when first brought in, smoked as if on fire. To prevent the tongue and lips from being frozen at the first taste of the meat, it was held, for a few moments in mittened hands, and breathed upon, the children's share being kept awhile in their parents' mouths. At 9 P.M. the whole party huddled together for the night, some compelled to sit upright through the long hours of sleep. Seventeen breathers were sealed up, with a large snow-block, in a hut but ten feet in diameter ! On opposite sides of the trench, nine were on the platform and eight on the other ; every



ARROWTAR, SNOW-BEATER.

one, Innuït fashion, having the head toward the trench. In the morning, between the hours of three and four, the men waked, ate a quantity of deer-meat, smoked, and again went to sleep. At five, the whole party were amused to find that the lamp-smoke had covered them with soot. Hall waked with "a severe headache from the excess of carbonic acid gas, generated by the three fire-lights and seventeen people." At the close of a second day's journey of twenty-six miles, in the igloo next built, slabs of frozen walrus-hide were hung on spears crosswise near the top of the hut, and from these slabs, partially thawed by the fire-lamps, the dogs were fed. On the evening of the sixth day, a welcoming signal from the mast of the "Monticello" caught the eye.

A month was now spent willingly among the officers and crews of this whaler and those of four others anchored near. The natives relishing their stay yet the more, left Hall but half his number of helpers for his return to Noo-wook ; he had failed to get the promise of a dog-team for his spring journey, and on his return trip he was limited by his native friend the guide and sled-owner, to the unpalatable food of

the walrus-hide. The same native, Shoo-she-ark-nook, also showed signs of insincere dealing, in his attempted persuasions to his companions to leave the white man, and in his appropriating to his own use some articles from Hall's igloo. Confidence could not well be maintained, and yet the kodluna was wholly dependent on this uncertain people.

The severity of the cold, and the consequent shortening of provisions, now began to prove very serious. Seal-hunts were rarely successful, and the want of blubber for light and heat gave great uneasiness. The journal of March 14 says: "How cheerless is our igloo! The moss-wick of our lamp, which, when we have our full supply of blubber, gives a continuity of flame of two feet six inches, is narrowed down to a simple wick-point, and makes the gloom more dismal than total darkness. Long and cast-down faces are now faintly seen, that otherwise would be veiled from us. Our huts are sad, our voices almost hushed! But away, away, thou fiend of Despair! This is no home for you. We are the children of Hope, Prayer, and Work. God is our Father, and better times will come." They came in the beginning of May only, when, after nine weary months from the time of his first landing, Hall found himself encamped on the Wager River, on which he had hoped to be set ashore from the whalers. The last days of April had put his party into huts, on the ice of the river in lat. 65° 19'. The temperature was still as low as 42° below freezing point.

But sealing now began to be successful. Nu-ker-zhoo with one stroke harpooned a mother and her pup; five more seals were the next prize; and Hall, amid the congratulations of the natives, made his own first capture. He had learned some of the Innuvit stratagems, and with their help put them in play. Going out with Nu-ker-zhoo on his hunt, he had watched for some hours with him, and afterwards on another hunt with Ebierbing. Nu-ker-zhoo's watch was a marked one. At a seal-hole three miles out from the shore, where he had discovered a seal-hole, he had built for his protection from the wind a snow-wall, five feet in diameter and five feet high on the north,—a foot and a half only on the south. Into this hole he ran a whalebone rod, which, by striking ice, showed that some time had passed since the

seal had been there; drawing out the rod and smelling it, he whispered, "*tepid*" (stink-bull seal). Returning the rod to the same little hole, he carefully scraped the snow from around the rod, so as to leave only about six inches above the seal-hole, and then drew out the rod, and placed the end of the wood-part of his *oo-nar* directly over the rod-hole. Holding this perpendicularly with one hand, he used the other in packing snow around it till he had returned the ten inches of



EBIERBING (JOE) GOING OUT SEAL-HUNTING.

snow over the seal-hole which he had scraped away. Then the spear-handle was lifted up gently, which left an inch-square hole; which was to be his mark and guide for his harpoon in striking the seal as soon as he should hear it. He then ran the little rod down through the dome of the seal's house (or, as it may be called, *agloo*, for it is really a small snow-hut), to determine the depth of the snow over it; for it was on this his feet were to rest while watching.

Expecting to spend the whole night in silence, he threw down a piece of furred deerskin for a cushion, preventing also the slightest noise from his movements; to keep his feet warm

and close together, he drew on a short bag of reindeer skin, fur inside, and tied his legs together, and wrapped his frock-tail close around him. His *oo-nar*, with harpoon and line, were placed on two pegs a little in advance, so that when bending forward he could touch his spear. With these quiet preparations he bade Hall good-night, saying that by his leaving the *agloo* the seal would think no one was left behind. His precautions were not useless, for he had failed in a previous watch just when

about to strike his prize, the wary seal being frightened off by the fall of a mitten from his belt.

On Ebierbing's watch, he had cut down into the snow to satisfy himself by repeated smellings that the seal had been there, and then he scraped away the outside snow down to the thin icy crust, the seal's breathing-hole. Making then a central downward cut, and removing from it a solitary hair from his outer frock, lest the seal should "smell him quick," he set up over the hole a snow-block, of which about three inches was above the snow, for a mark for his harpoon, and passed the watch of a whole night, — not an unusual length of waiting, for at times he had passed from twenty-four to forty-eight hours on such weary work.

Hall's watch was, happily for him, that of an hour only. He succeeded in making a telling blow with the spear, and in holding on to his line until the seal, on coming up to blow, was despatched by Nuker-zhoo's long knife. Hall was the first white man who had caught a seal in that country.

The first fish caught by a new hand, the first one of the season caught by watching over an ice-hole, and the first caught in open water, are times of joyous demonstrations, in which usually all share except those who have been afflicted by death in their families during the year. Before the middle of May as many as ten were taken in one day, and almost entirely devoured as fast as brought in. Of the quality and effects of the meat Hall remarks, that to live upon it alone is excessively constipating on the white man, old walrus-meat affecting the system much in the same way. Too-koo-litoo thought that the reason the Innuits of that region were so dark-colored was their eating so much raw seal-meat and blood. It seems, indeed, surprising that they can so readily make way with such huge quantities of animals, weighing each two hundred pounds and upwards.

The first five days of June were in marked contrast with the spring months. The rapid advance of the warm season had required a change from the snow-huts to the *tupiks* (skin-tents), which were set up on an island along the shore of the Wager. The deserted Kommongs, or

half-snow-houses, had become untenable by the snow-drippings, and the remains, when broken down, presented a strong contrast to the beautiful arched and solid domes spoken of by Hall in the previous autumn.*

The summer months of 1865 were spent by the natives in securing the game for their subsistence during the coming winter, the successful hunts of July alone footing up twelve seals, nine *ook-gooks*, thirty-seven deer, a bear, and some ducks. Compelled to await even through another winter his chances of moving westward toward King William Land, Hall's chief occupation was limited to such observations for the coast-lines of the Bay as his instruments permitted him to make. He had further opportunities of witnessing the native ways of making use of the seal, the walrus, and the deer for food, and in the manufacture of useful things. For making lines from the skin of the *ook-gook* for uses in the hunt, the Innuits cut the skin into long strips, which they stretched between the rocks by a block and tackle which they obtained from the whalers; these strips, made soft and pliable by rubbing and chewing, were very strong for sledge tracings and lashings and for securing a walrus.

To save the blubber of the seals for deposit for winter use in a *cache*, the natives stored it in seal-skin *drugs* (bags) made from the skin of the animal, unbroken except by a small opening about the head. To get the blubber out, the knife was thrust in longitudinally, to separate it from the skin, the fore-flipper was jointed, and the seal then worked out by the hole made at the head.

When making the deposits of the reindeer, the custom is to place upon and around the carcass the head, legs, shoulders and saddle, covering the whole with a heavy pile of stones. When this is done, as is

* Captain Lyon, in his Journal of Parry's Second Voyage, 1821-23, says of a like scene; "I had several times, in my rambles through the world, seen huts which I imagined could not be equalled in wretchedness of appearance; but I was yet to learn that of all miserable places on earth, a snow village, recently deserted, is the most gloomy. . . . The roofs melted into icicles and coated with smoke; arches broken and falling from decay; the snow seats, floors, and partitions covered with every kind of filth and rubbish — bones, broken utensils, and scraps of skins — form altogether the most deplorable picture, while the general air of misery is augmented tenfold by the strong glare of light which shoots through a hole once occupied by a window."

usual, in the later part of the season, the whole mass soon becomes so solid with ice, that it can be opened only with great force, the natives using for this purpose heavy wedge-shaped stones.

The first opportunity now offered itself for the successful issue of one of the important elements in the original plan presented to the friends of the expedition in New York in 1862—the capture of



CAPTURING A WHALE.

whales, which would repay in part the advances made for the outfit. After a number of cruises in the boats without being able to come quite within striking distance, August 30, Hall was congratulated by all his Innuït friends for the success of the day. With his party of men and boys he left the tupiks at four A.M. to hunt a whale which had been for some time previous blowing around. His boats, the "Sylvia" and the "Lady Franklin," gave swift chase to the westward, but after an hour's cruise, during which the whale made several risings, they were unable to get close enough, although they came almost upon it

when rowing from an opposite direction around an islet. A second whale was, however, almost immediately seen half a mile to the southwest, when the sails were quickly set, and paddles and oars vigorously plied by the crews of both boats, "each of which ran down the leg of a V, the whale at its joining point." Ou-e-la, from the bow of the "Lady Franklin," which reached the goal a few seconds before the "Sylvia," threw a whale's harpoon, to which was attached a line of twenty fathoms, having at its end two drugs (floats). One of these was the forward part of an *ook-gook* skin, the covering of the head and flippers being as entire as when upon the living animal, with the exception of the transverse seam; the other was the entire skin of a *neit-yuk*. Both were filled with air, compressed by the stout lungs of an Innuït. Their double object was to indicate where the whale was and to tire it down. When Ou-e-la's iron struck into the back of the whale, it gave one slap of its flukes, and went below the white, seething waters, at first disappointing Hall, who thought it was now lost; he had furnished Ou-e-la on setting out with a full length of line, and was not acquainted with this Innuït use of floats. But while the boats lay to, watching for a reappearance, the drugs were seen far out in the bay flying over the waters, though with decreasing speed, and on the whale's coming up again to blow, it received a harpoon from Nu-ker-zhoo, at the bow of the "Sylvia," and Ou-e-la's iron drew. The whale again turned flukes for soundings, taking out with him half of the "Sylvia's" whale-line; it then immediately struck seaward, dragging the boat through the water with great speed, but on its coming up and blowing, Ou-e-la lanced it from the "Lady Franklin." It died within one hour from the first attack.

The anchor was dropped from the "Sylvia," the corners of the whale's flukes were cut off, its mouth tied up, and the fins taken, one into each boat. The towing of the animal to a floe was made with slow progress against head tide, but at one P.M. the prize was taken into a small cove near the *tupiks*. Hall had breakfasted on raw *muk-tuk* as soon as the whale was killed. The Innuïts, though equally fond of the skin, could not join him, because they had already eaten *took-too*; in obedience to a like superstitious idea, three days must elapse after

the capture of a whale before any work could be done. On the day following, the carcass was cut up and *cached* amid scenes of feasting; fifteen hundred pounds of the bone, designed by Hall for the benefit of his expedition, were securely deposited, to be available on the return of the whalers to the bay in the following fall.

WINTER QUARTERS AT RAE'S FORT HOPE (1865-66).

On the 4th of September Hall made his twenty-sixth encampment on the banks of North Pole River, near the Fort Hope of Dr. Rae. This was to be his winter quarters, in which he was to prepare for his sledge journey next season to the west.

From this point also he would make a survey of the bay, his observations of the coast-line already made having satisfied him that an improvement of the charts could be made for the whalers. Steadfast in the purpose to succeed in the several objects of his voyage, he had declined to accept offers from the whalers for a passage home. When he now set up this *upik* the glories of a beautiful sunset were changing the Arctic hues of the landscape into tropical warm coloring, and filling the grayish cool atmosphere with an unusual brilliancy. His plans for the next year involved the securing the continued friendship of the Innuits and the storing of provisions for the long sledge journey as well as for the winter supply. The larger part of the tribe scattered themselves at points some distance off, exchanging visits with him during the following closed season. His two close companions, Joe and Too-koo-litoo (Hannah), remained in his igloo.

Excepting occasionally a few salmon or perhaps a dozen partridges no provision was available during the severe winter months but the deer-meat. To visit the deposits was then a matter of frequency, and often a work of severe exposure and labor; nor, because of the scarcity of fuel, was it often practicable to have much cooking done.

A very large number of deer had been deposited;—in September as many as ninety-three, in the latter part of which month Hall estimated that as many as a thousand passed in one day; in November fifty more were *cached*; and a few were seen as late as January 27. They did

not again appear until the end of March, when the does that were with young began their migration.

Hall's share in the exposures, labors, and privations of the season was again of a severely trying character. On one visit to his favorite deer-pass, where he had been accustomed to watch behind a stone wall, he endeavored with Joe to *cache* five that they had killed the day previous, and within the weary hours of piling up over them rock and

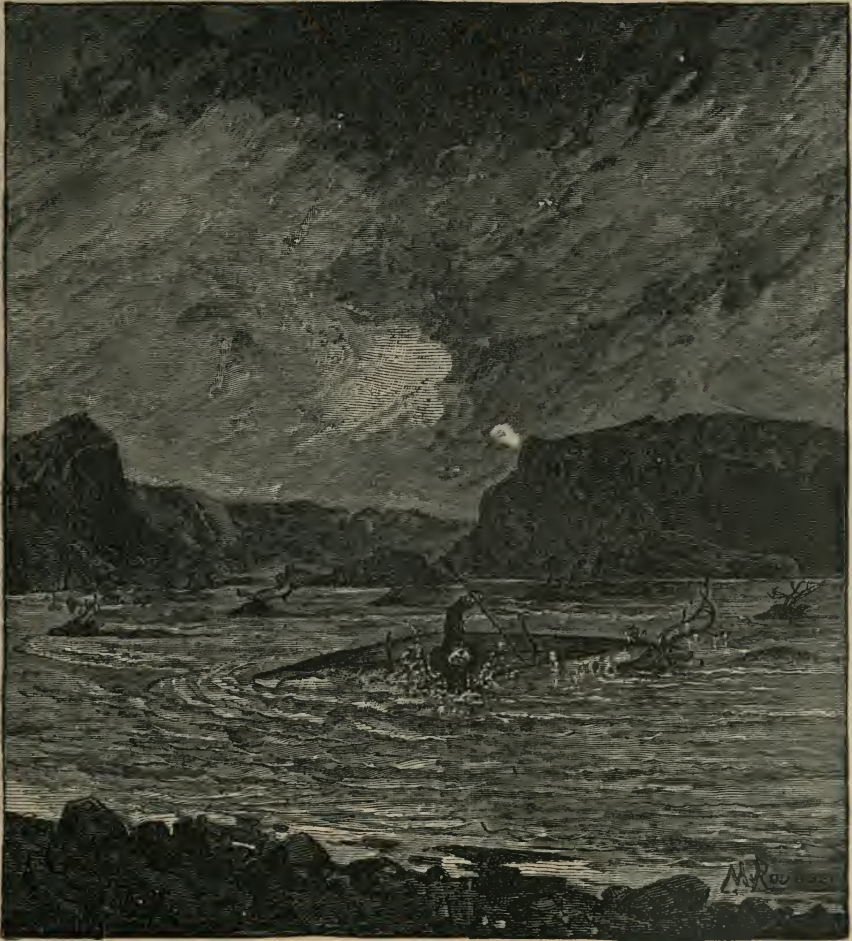


TOO-KOO-LITOO (HANNAH).

stone was overtaken by a fierce storm of sharp, cutting, blinding snow on the wings of the gale, — enough, he said, to make one exclaim, “None but devils should be doomed to such a punishment.” Entering the hut on their return each seemed to the other and to Too-koo-litoo a pillar of snow, until for a long time they had pounded and threshed their native dresses. On another visit he had the misfortune to find that a deposit made six feet above the river level had been swept by a six-days’ gale and storm. The main supply of food must, however, be from these deposits. At times, however, his store-house was well filled, and a season of feasting ensued; and as often, through a failure in

recovering the deposits, or through the caprice of the Innuits, he was placed on short rations. His Journal of January 21 tells the following: “I arise usually between seven and eight in the morning, and after smoking a little, cut a few chips from whatever little choice block of venison I may happen to have, and eat the same raw and hard frozen. As eating venison alone is dry work unless one has *tood-noo*, I eat seal blubber, which is old, of strong color, and of strong old cheese-taste. About

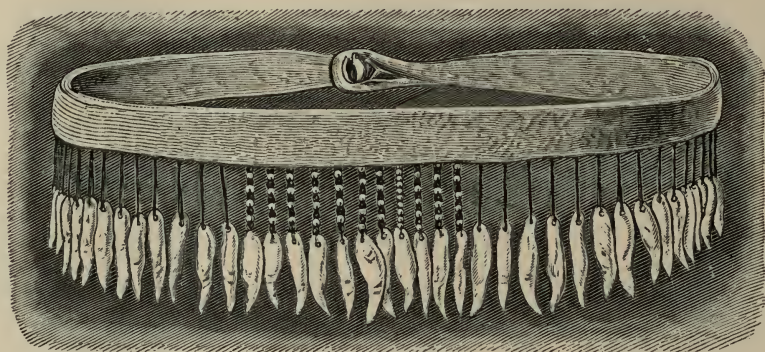
four ounces of venison and one ounce of blubber make my breakfast. Had I abundance of the former, I should eat nearer four pounds than four ounces, for it must be remembered that it takes



AR-TOO-A DROWNED IN HIS KIA.

a great deal of the venison of this country to supply one's appetite and necessities in the winter. In the neighborhood of noon (really there is no particular time of one's taking his meals when living as the Innuits do) I dine on what would be called old, stinking, nauseating whale-skin ; *but to a hungry soul every bitter thing is sweet*, and I, indeed, find it so. Some of the effects of eating the first few times of

this *muktuk* (whale-skin) are very severe griping pains in the stomach and bowels, followed by copious diarrhœa. Nearly every Innuït, great and small, in the village, as well as myself, has suffered thus by eating this whale-skin. There were seven patients on my hands one day last week suffering with the above-named complaint. For my lunch, or supper, I pick out the fatty substance of a whale-fin, and eat with it a little more of my *took-too* meat, about the same amount as for my breakfast, topping off with delicate slices of raw whale-beef or whale-skin, and go to bed hungry, but as soon as I am asleep I dream of friends and



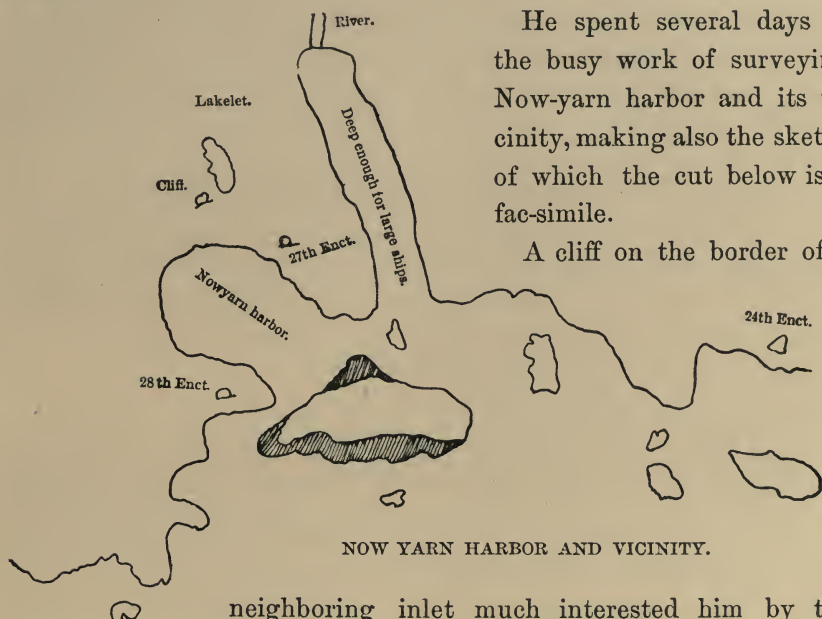
INNUIT HEAD-ORNAMENT.

better times coming. . . . I frequently feast on tallow candles, which word I use as a figure for pure deer-tallow (*tood-noo*), of which I made excellent dip candles, and not having use for them have eaten them with good relish."

The work of preparing deerskins for clothing chiefly occupied him, with the assistance of Joe, the wife being disabled by Innuït custom from working on this, as she was a young mother. Hall dressed himself entirely in furs; Joe could make for himself with the needle good mittens and boots.

On a visit to the village of *Now-yarn* he learned the death of *Ar-too-a*, who, contrary to custom, had gone out alone in his *kia*. His boat and implements had been found, but not the body. It was thought that while spearing one of a band of deer crossing the lake, his boat had been struck by the horns of the animal.

On the return of New Year's day a ball was held in his igloo, where the men, wearing masks of reindeer skin, kept up their dances and the performances of the *key-low-tik* to a late hour. Wrestling and other gymnastic exercises, such as tight-rope dancing, were very frequent in the village. The women at such times were gayly attired.



He spent several days in the busy work of surveying Now-yarn harbor and its vicinity, making also the sketch of which the cut below is a fac-simile.

A cliff on the border of a

neighboring inlet much interested him by the Innuït tradition with which it was connected. Ou-e-la's story was that years before, two little girls, while playing about this cliff with infants in hoods on their backs, had gone into an opening between the rocks, which closed upon them before escape was possible. All attempts at rescue were unsuccessful, and the poor children, to whom for a time bread and water were passed, perished in the cliff.

AURORAS.

Auroras were frequent during the months of November, February, and March. More than once on witnessing them Hall found the question arising: "Why is it that the aurora is almost always seen in the Southern heavens? Why do we not see the same north of us? I have seen the aurora at Wager Bay, at Noo-wook, at Depot Island, and from

various places about Repulse Bay, and almost uniformly the phenomenon is seen southerly of the point wherever I happened to be. The same was true in my previous voyage (1860-62) — that the aurora was seen south. In this connection I would state that from all I have been able to learn in the many close observations I have made during their displays, the aurora is generally not far distant, — oft-times within a few hundred feet, — and continues within a stone's throw of one's head. If an army of men were close together in line, and extended from here to York Factory, I am sure each man would see the auroral displays all south of him; and yet the most distant displays would not exceed ten or fifteen miles, while the most of the auroras would be within a half to three miles of him."

[Between the parallel of fifty degrees north and that of sixty-two degrees north, auroras during the winter are seen almost every night. They appear high in the heavens, and as often to the south as to the north. In regions further north they are seldom seen except in the south. — Prof. E. LOOMIS' "Treatise on Meteorology," p. 187.]

November 7, the rays of an aurora shot horizontally to the eastward, in the direction of the magnetic meridian; and at 7 P.M. of the 10th a third auroral veil covered the sky, lasting twenty minutes.

February 6, the passageway of Hall's igloo was flooded with the light of an aurora. On going out he saw a long belt extending far east-southeast, and far west-northwest, the centre of it a trifle south, but apparently within a pistol-shot. "The rays were all vertical and dancing right merrily. This whole belt was remarkably low down, — that is, apparently not more than fifty or seventy-five feet from the earth, — and along the base of it, from end to end, was a continuous stream of prismatic fires, which, with the golden rays of light jetting upward and racing backward and forward — some dancing merrily one way, while others did the same from the opposite direction — made one of the most gorgeous, soul-inspiring displays I ever witnessed. The Innuits, nearly the whole of whom witnessed the grand sight, kept up, as they always do on such occasions, their charming music — that is, whistling. The display lasted but a few minutes." The following night something of a like display was witnessed; a single streak of aurora shot up from

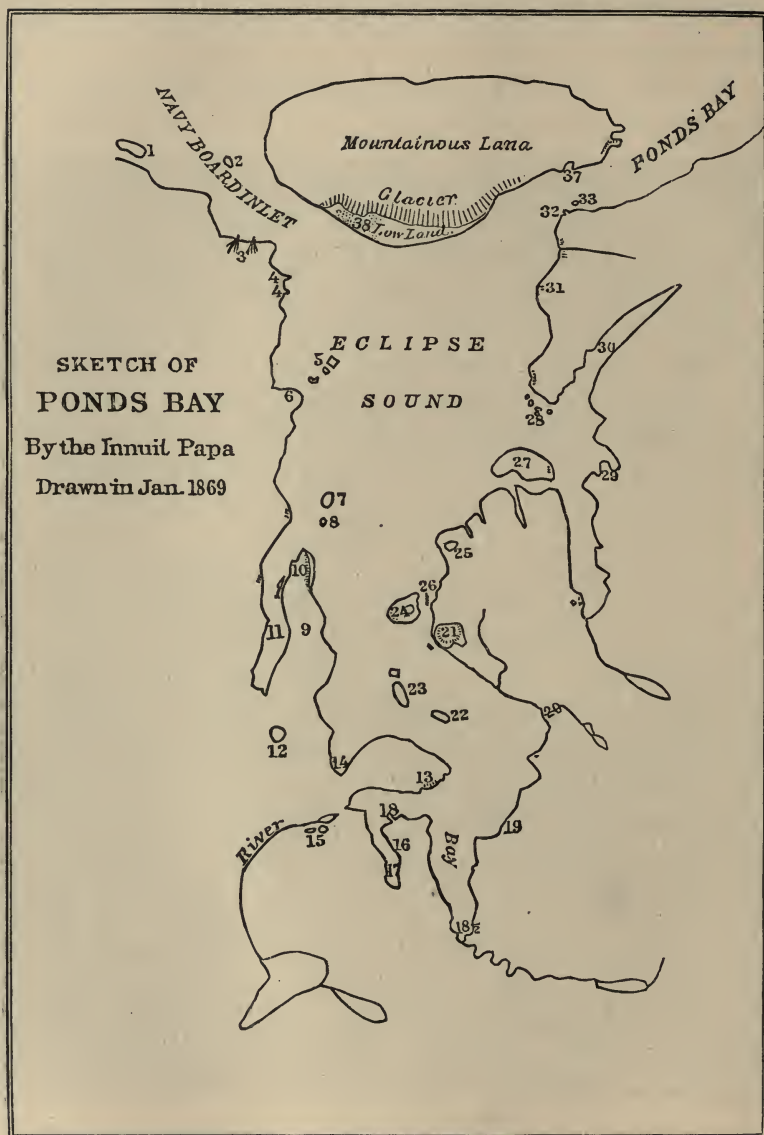
the south, and in a few moments the whole horizon was alive with the dancing fires of the north.

On the 19th there was a display of aurora upon which the wind had no apparent effect, although a gale was blowing. On the 10th of



AURORA SKETCHED BY HALL.

March, a wondrous display stretched across the southern horizon from east-southeast to west-southwest. "The eastern half was in the form of an arch, with vertical rays, while the western half was convolved in such vast glowing circles that nearly a quarter of the heavens seemed on fire. The eastern half consisted of bosses or birch broom-heads,



THE NOS. ON PAPA'S CHART REFER TO INNUIT NAMES OF LOCAL POINTS KNOWN TO THEM.

springing into life and dancing merrily to and fro along the vertex of the highest rays forming the arch. To each broom-head was a complete nucleus, well-defined, about which the rays, inclined about

forty-five degrees to the east, played most fantastically. One was quite alone in its glory, for not only had it the embellishments of its sister broom-heads, but golden hair radiated from its head in all directions."

The journals of November have interesting notes also of refraction and parhelia. At 10 h. 12 min. 41 sec. mean time of Fort Hope the sun's lower limb was a half degree above the sea horizon; Southampton Island by refraction loomed up from ten to thirty minutes of arc above it, although at no other time visible from Hall's place of observation, opposite Rae's Beacon Hill. Cape Frigid, forty-seven geographical miles distant, was visible, and the coast-lines yet further south, while a zone of about five degrees in width from the horizon upward was of resplendent colors extending around the heavens, the half circle opposite the sun being the more brilliant. At sunset the phenomenon renewed itself. A mock sun on the 30th deceived the untutored natives.

During the last of the winter of 1865 and the beginning of the spring following, estrangements from the good feeling which had existed between the white man and the natives showed themselves to a degree producing disquiet and even some apprehension of personal danger. But Hall succeeded in preserving his own equanimity and his control over the restless spirits of Ou-e-la, Ar-mou, and their people. His chief dependence for securing this was his known connection with the whalers, whose return was now again to be expected in the bay, and, next to this, his frequent supplies of tobacco. Happily the estrangements were not serious. Both these chiefs had committed themselves and their people to the promise of assistance on his never-forgotten journey toward King William Land, and he was dependent on this promise.

Ar-mou made for him a complete chart of the coasts he had visited, embracing a line from Pond's Bay to Fort Churchill, a distance of 966 nautical miles — a map rendering valuable aid to the explorer.*

* In the "Fortnightly Review" for September, 1880, Mr. Francis Galton, F.R.S., in an article under the heading of "Mental Imagery," says: "The Eskimos are geographers by instinct, and appear to see vast tracts of country mapped out in their heads." From the multitude of illustrations of their map-drawing powers, I will select one from those

FIRST ADVANCE TOWARDS KING WILLIAM LAND.

Hall's occupations at Fort Hope had been the preparing the necessary provisions and stores for this first westward advance. March 30, 1866, his native friends Ar-mou, See-gar, Ar-goo-moo-too-lik, and Ou-e-la gave proof of renewed friendship by the loan of their dogs; this was the more pleasing, as during the winter he had almost despaired of securing a team, his own stock consisting of "but two female dogs equal to one good dog, and two puppies equal to a quarter of a good dog." The price at which one had been held was not lower than a double-barrelled gun.

Ebierbing, Ar-mou, and Nu-ker-zhoo, with their families, and the young native She-nuk-shoo, made up his party; all the others had gone off from the encampment. The start was made with the wind fresh from the North-northwest and the temperature 50° below frost point, and the gale became very severe, beating fiercely and directly in the face of one who was poorly prepared to bear it from his having eaten little or no food for several days. In writing of this, he says there had been before him an abundance of such as he would have relished, if he could relish anything; but he had been so busy in writing and so enwrapped in anxieties that he had little or no appetite.

included in the Journals of Captain Hall at page 224, which were published last year by the U. S. Government under the editorship of Prof. J. E. Nourse. It is the fac-simile of a chart drawn by an Eskimo who was a thorough barbarian in the accepted sense of the word; that is to say, he spoke no language except his own uncouth tongue. He was wholly uneducated according to our modern ideas, and he lived in what we should call a strange fashion. This man drew from memory a chart of the region over which he had at one time or another gone in a canoe. It extended from Pond's Bay, in lat. 73° , to Fort Churchill, in lat. $58^{\circ} 44'$, over a distance in a straight line of more than 960 to 1,100 English miles, the coast being so indented by arms of the sea that its length is six times as great. On the comparing this chart (rough Eskimo outline) with the Admiralty chart of 1870, their accordance is remarkable. I have seen many route-maps made by travellers in past years, when the scientific exploration of the world was much less advanced than it is now, and I can confidently say that I have never known of any traveller, white, brown, or black, civilized or uncivilized, in Africa, Asia, or Australia, who, being unprovided with instruments, and trusting to his memory alone, has produced a chart comparable in extent and accuracy to this barbarous Eskimo. Their powers of accurate drawing are abundantly testified by the numerous illustrations in Rink's work, all of which were made by self-taught men, and are thoroughly reliable."

"The labor of the writing which I have done, without speaking of anything else, has been enough to kill many a man and has nearly killed me."

His route was up the North Pole River, north 50° east. To shelter himself from the sharp wind, he held his head at times low down behind the load on the sled.

On the way a new source of delay was caused by the continued illness of Too-koo-litoo's babe, for whose relief her Innuït friends recommended and practised different forms of an-kooting. On the 4th, the an-ge-ko put a leather strap around Ebierbing's head while lying on the bed; and when he occasionally pulled on this strap the head came up, or it remained firmly down, though the lifts were hard; the raising of the head or its remaining steady, indicated the different replies to the questions asked as to the future of the babe. On the 7th, the babe's health not having improved, Nu-ker-zhoo as "a newly-fledged an-ge-ko" entered on his work by pulling the strap around the head of one of the women, and while propounding many questions to the Spirit, brought up her head when only an affirmative was made. For the third operation, on the 8th, Nu-ker-zhoo brought into the igloo a stone weighing ten pounds, to which he made fast a string of ook-gook skin which he held in both hands, the hand nearest the stone being used as a kind of fulcrum as well as for lifting power. Holding on to the string he began to woo or call the Spirit, by repeatedly calling out "Attee, Attee;" lifting or pretending to lift on the stone to determine whether the Spirit answered. In two or three minutes it became immovable by the Spirit, as they believed, pulling hard down; and this was a sign that any questions would be answered. Some of the questions were: Should the child take any more of Hall's medicines? or had Too-koo-litoo conformed to her people's customs? Would the child live? Answers to the two first of these were always negative; to the third it was in substance that, if the mother would give up the use of the bread and tea, or stay with Ou-e-la's people the child might live, but if the parents went forward one of the three would surely die. Such answers on either side were indicated by the difficulty in lifting the stone: if the answer was no, it had its natural weight only; if yes, it was hard to raise it

the least bit. Hall could not undeceive the parents about this lifting, though the an-ge-ko's work was readily seen through, and on the 15th, Too-koo-litoo in her anxiety took her full share in another an-koot-ing, and then in despair agreed to a decree to give away the babe and thus save its life ; but, on Hall's remonstrance, the child was restored to the mother.

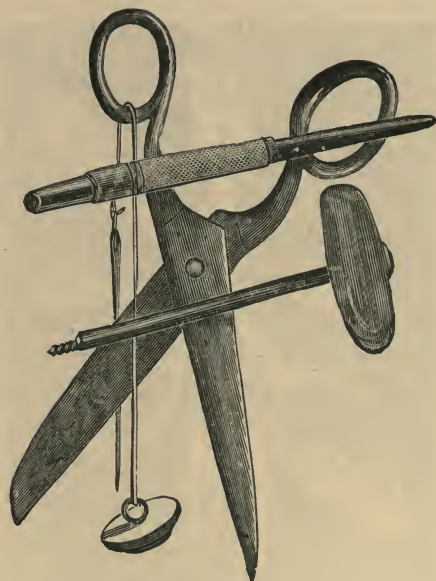
On the 13th, the long-expected death of the child took place. The almost distracted mother, the moment she found it was really dead, rushed out of the igloo, pressing the dead baby to her bosom and pouring out her soul's grief. Her leaving the igloo so quickly was in accordance with Innuít custom ; for if this is not done when any one dies in it, everything becomes worthless ; in this case it was considered that the mother went out soon enough, so that the bedding and everything else need not be thrown away. In ten minutes she returned and took her seat on the bed platform, grieving for a very long time as a loving mother only grieves, but at length was persuaded by Mam-mark to let the dead baby be taken from her bosom and wrapped in a small furred *took-too* skin. Mam-mark insisted that, according to the custom of her people, the remains must be buried at once ; but, on Hall's remonstrating and urging that they should be kept till at least the next day, a compromise was made, and the child that died at twenty-five minutes past 1 P.M. was buried at 6.30. It was wrapped in a blanket of *took-too* skin of long fur, tied with thongs, and having a loop in it to go over the neck of the mother, who must carry the corpse. A hole having been cut through the wall of the igloo for the procession of four persons in single file, Hall, Mam-mark, the mother with the babe suspended from her neck, and the father following close, proceeded to the place of burial on a little hill, which Hall had selected.

Delays from other sources increased, the Innuits sometimes pleading that they must turn aside for a musk-ox hunt, and then rest the whole of the day following. The average travel was scarcely more than from two to three miles per day, the party nearing Cape Weynton on the south side of Colville Bay at the close of the twenty-eighth day ; — a journey made by Dr. Rae in '54, without a dog-team, in five days.

STRANGE NATIVES MET.

A new era in the history of the journey now opened. Ascending a berg above a floe to prospect the route across the bay, Hall and his two natives caught sight of four strange Innuits, who appeared to be sealing some three miles off. This was exciting to each, yet it was necessary to be friendly as well as cautious, for some more news of the Franklin party might possibly be obtained from the strangers, and Hall was ever on the look-out for this. He quickly sent back for the rest of his party, who hastened to him; but Nu-ker-zhoo felt sure that he was looking out on old friends. Going forward, therefore, Hall arrived at sunset near the strangers, and encamped there for the night; at dawn of day, his new igloo was filled with new faces, and a story of interest was unfolded.

Kok-lee-arng-nun, their chief, showed two spoons which, he said, had been given to him by Aglooka; on one were the letters F. R. M. C. The wife had a silver watchcase. Too-koo-litoo learned also from



FRANKLIN RELICS

the men that their people had been, at one time, alongside of "the ships," and had seen the great Eshemutta (Franklin). "This Eshemutta was an old man with broad shoulders, gray hair, full face, and bald head. He was always wearing something over his eyes,"—"spectacles," as Too-koo-litoo described them. "He was quite lame and sick when they last saw him. He was always very kind, wanted them to eat constantly, very cheerful and laughing; everybody liked him, Innuits and all on the ship; they on the ship would always do what he said. The ship was crushed by the ice. While it was sinking, the men worked for their lives, but before they could get much out from

the vessel, she sank. For this reason Aglooka (Crozier) died of starvation, for he could not get provisions to carry with him on his land journey."

The Pelly Bay men further said that they had for a long time feared to go aboard the other ship, but on seeing one man alive on it, some of them had gone and rummaged everywhere, taking out what they wanted for themselves; and that afterwards two boats had been found with dead men in them.



FRANKLIN RELICS.

The fish-head crest identifies them as Franklin's.

Hall obtained from these men a number of relics, of which the cuts are specimens. But with the exception of the news received, and of its good indications of what could be obtained of greater worth when a visit should be made to the region where these things had happened, there was little advantage to be derived from this meeting, or indeed from the journey which had now ended.

The new-comers did not appear willing to be friends; they engaged in the old an-kooting business with zest, spending their time and that of Hall's party in it; and they made the party dissatisfied with the idea of advancing any

further that season, frightening them from so doing. Nu-ker-zhoo said he was not afraid to go on, but the rest, at last, showed evident signs of fear, and it would have been useless to attempt an advance. Hall most unwillingly agreed to return, and began to see that a journey as far westward as he contemplated was not by any means promising, if he was to depend on the Innuits alone. He resolved, therefore, to attempt it with the aid of a party of white men, whom he hoped he could secure from the whalers in the spring of the next season. Stor-

ing a goodly quantity of provisions for such a journey, he left Cape Weynton with a saddened heart, and on the 23d of May was safe again at his old camping-ground of Beacon Hill.

DELAYS AT REPULSE BAY, AND MID-WINTER SLEDGE
JOURNEY. — 1866-67.

Two full years had now passed since the sailing from New London. The first landing at a mistaken point of the country had cost a year's delay, and the failure to obtain trustworthy native help had now turned Hall back from his hoped-for advance to King William Land. The first page of his note-book, for March 31, 1861, had upon it in bold writing: "Now for King William Land! up at four A.M., and getting ready for a start"; but the notes of May 25, 1866, read: "To-day my King William party is ended for the present — *disappointed but not discouraged.*"

Yet he had the full consciousness that at least nine months must be passed before he could again set his face towards the west, and that he could neither trust the Innuits for an advance, nor be sure of securing sufficient provisions and dog-teams for so long a journey. He had reason to desire to meet again the Pelly Bay men, for *See-pung-er* had visited King William Land and had told of a Cairn, seen there by him, which had been built by the *Kod-lu-nas*; he had also spoken of having found papers within it, which being good for nothing to Innuits, had been given to children or thrown away; he had spent one night near this pile, wrapping himself in blankets taken off some banked-up clothing of white men; a skeleton being found near the pile. Hall almost persuaded himself that within that pile the Records must be found.

But for any assistance toward that next journey, he must wait for the coming in of some of the whaling fleet of the season. After an occupancy of two months in boat journeys for completing the survey of the bay, and after another long sufferance of the continued low customs of the natives, he was gratified by the arrival of the "Pioneer," from New London, and answered Captain Morgan's salutation in tears; the sight once more of a friend from the midst of home friends, was an overmatch for all the roughness which had been forced upon his nature

by the ignorant and degraded. Several other vessels soon came in; the "Black Eagle" bringing him letters from Mr. Grinnell, and from Messrs. Harper, his publishers, a copy of the "Arctic Researches," the proof corrections of which he had returned from St. John's. Mr. Grinnell sent him a letter from Lady Franklin, in which she had expressed the deepest sympathy in his work.

He was now successful in securing a second whale, the length of which was sixty feet, and its blubber sufficient to yield sixty barrels of oil. By September, with native help, he had placed on board the "Ansel Gibbs" about one thousand five hundred pounds of bone, to be sold on the return of the ship to the United States.

But the whalers were not to return that season, the meagre results of their cruises forcing them to await the chances of a second year. From their crews, however, he soon had volunteers as substitutes for the natives, and he had hopes of obtaining a sufficient number of dogs. With the two Eskimo friends, he again set up his tupik on Beacon Hill, Dr. Rae's tenting-place of 1847, and entered with zest into the hunt for provisioning the coming winter, and in October, within his igloo, settled himself down to his plans and hopes.

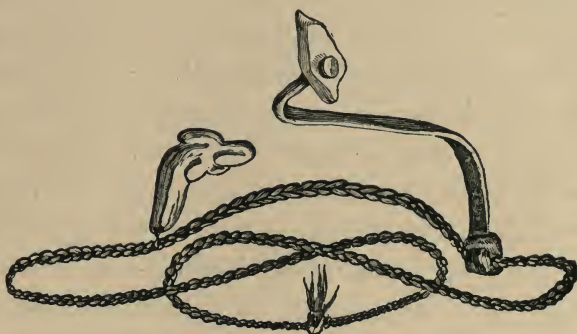
Yet before the first month of the New Year closed, he learned from the captains of the four vessels, that they would not permit the Innuits to supply him with a single dog for the coming journey. They were feeding this people through the winter, and they would need all their dogs for sledding blubber and bone, at the opening season, from the water to the ships. Helpless to enforce his claim, Hall determined, therefore, to make a sledge-trip to Amitoke, or, perhaps, to Ig-loo-lik, even in the depth of winter to buy his dogs. The journey might be one of more than three hundred miles, but another year could not be lost.

JOURNEY TO IG-LOO-LIK.

February 7, 1867, in the judgment of the best Arctic authorities "two months before any sledge journey should be attempted unless to save life," he set out for Ig-loo-lik with Ou-e-la, his wife, a boy, and a half-breed babe, as his only companions.

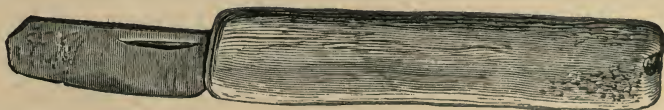
The usual delays were experienced. Ou-e-la stopped to visit the grave of his brother, and as at this stoppage some of the dogs were missing, a return to the ships became necessary; on the renewal of the route, the babe began to be both an annoyance and the cause of repeated halts, and the dog-lines at one time became entangled, causing them to be detached from the *peto*, — the line of walrus-skin fastening their traces to the sled-runners, its ends being bound together by a toggle.

After the severe experiences of further delays in gale-bound igloos, and of extreme scarcity of food chafing even Ou-e-la's spirit to anger, the sledge-party



BONE-CHARMS OF IG-LOO-LIK.

arrived at Ig-loo-lik on the night of the 26th; and, by securing the goodwill of the people by presents of needles, beads, and other articles, Hall "bartered for fourteen dogs, in as many minutes, setting his own price on each." His articles of barter were, knives, files, and even pieces of old hoop-iron, and wood; but he as readily made this purchase as Mc-Clintock had in



KNIFE WHICH HAD BEEN USED IN SKULL-SCRAPING.

1859, when he bought a reindeer-coat for a knife, and a snow-house for four needles. For food to supply his return journey, Hall gave some hoop-iron, an old meat-can, and a stick of wood, receiving several thousand pounds of walrus-hide. The Ig-loo-lik people, glad to see a Kodlu-na, made him presents, the best of which was a warm fur-cap. The "bone-charms" were held in high esteem. The bone-handle knife was spoken of as having been used to scoop out the brains from the skulls of some Innuits by others, who had murdered them to save their own lives when perishing on the ice.

Anxious to return to the bay, that he might begin his westward journey, he was again delayed by the whims of Ou-e-la, but improved the time by a visit to the spot where Parry had erected his flagstaff (1825), and here he found, with much interest, pieces of that staff with clear indications, that, had the season permitted, he would have found below ground the written document of Parry's deposit. The trench made in dragging the flagstaff from the sea to where it was raised seemed as distinct as when first worn by it into the limestone. On the day of the start homeward, it was found that Ou-e-la had put on the sled beside his wife a widow and her child and all her traps; she was left behind only by large bribes from Hall. After further uncomfortable experiences from the savage, whom he felt more than once like shooting on the spot, — especially when refused, while sick, sufficient food, while Ou-e-la's family were feasting, — Hall again sighted the ships. His journey had cost him fifty-two more days of precious time; and he now found his plans again utterly arrested.

Two months before, when he had his men seemingly secured, the captains' plea had been that they could not spare the dogs. He had now returned from Ig-loo-lik with his own full team; but the whaling season is open and he is behind time; they cannot spare a man. He could punish Ou-e-la, as he now did, by seizing all his dogs and holding them until he had given penitent pledges for future good conduct, but it is not surprising that for a number of days he lay sick and almost hopeless in his igloo. He was able to punish Ou-e-la because of the presence of the whalers near by. He seems to have forgotten that the native had been irritated by being prevented from bringing home a second wife. Ou-e-la afterward rendered Hall much good assistance.

THE JOURNEY TO CAPE WEYNTON.

No new journey to King William Land! But if this could not be in the coming season, the cache made at the Cape, the year previous, must be visited, to make sure of the safety of its stores, which might serve for the year following. Hall feared that the Pelly Bay men would carry them off. By the assistance of three of the whaling crews

He started northward with them and his own two Eskimos, May 1, and on reaching his cache, discovered that all had been unmolested. Changing the place of deposit to one seemingly safer and of ready access, he again arrived at Beacon Hill on the seventeenth of the month. His hopeful confidence of a journey still to be made for the records remained unshaken, and the advance cache would be a necessity for its success. No connected notes are to be found of his occupations during the summer months which followed. In September he went into winter quarters with some of the whaling crews, at a point near the Beacon Hill of Dr. Rae. He would endure another Arctic winter in an igloo.

THE JOURNEY TO THE STRAITS OF FURY AND HECLA.

Every preparation seemingly needed was made for the King William Land journey before the winter of 1867-68 had closed. But Hall now felt himself "called to search first for the traces of the missing navigators in a new direction." This change of plan, he seems, with reason to have afterward regretted; at the time of his decision to make it, he thought himself sufficiently advised by the natives, to be justified in the course. The substance of the news which governed his new plan was, that white men had been seen within the previous three years near Ig-loo-lik, and that stone piles had also been found and tenting-places at points northward, which could not have been the work of others than Kod-lu-nas. Too promptly crediting these Innuit stories, and inferring from them that some of Franklin's men must have been in that region of country, possibly to seek a homeward passage thence to England, he decided to explore the coasts of the straits named above.

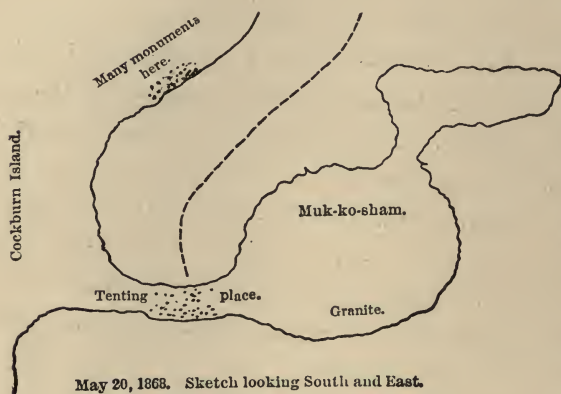
March 23, 1868, with his own two Eskimos, one white man, *Lailor*, and the native Pa-pa-too-a, he left his encampment. For a long journey he had but a small dog-team and a heavy load of provisions with articles for presents and barter. By a return of disease he had lost fifteen dogs, but happily succeeded in securing from the Innuits five of the eight only that remained alive about the bay.*

* The nature of the Eskimo dog disease was closely noted in the experience of the English expedition of 1875. The following is taken from the report of Fleet Surgeon B. Ninnis. (Parliamentary paper, C. 2176, 1878.)

"Twenty-five apparently healthy dogs were embarked on board ship in the middle of

At the end of the second week he was nearing Ig-loo-lik, and from further stories given to him on the neighboring islands, he was strengthened in the belief of what he had heard about the white men being

seen on the southern shores of the Strait. He seems to have really expected that he would soon find some of Franklin's men. The natives told him that strangers had again and again been seen there, and that gun discharges had been heard; the clothing of those seen was described, — the caps on the head



THE TENTING-PLACE.

separate from the overcoat, which had a hood; the footprints seen had been long and narrow in the middle with deep places in the heel; and the tread of the steps had always been outward. The last date of these stories was up to the year 1864; some of Franklin's men then, Hall thought, might have crossed over eastward to Parry's old region in the

July, 1875. The number subsequently increased to twenty-seven by the addition of two young ones. We were given to understand that feeding twice a week was amply sufficient; that the worst possible personal treatment was too good for them, and meat in any stage of decomposition a perfect luxury to their fastidious palates.

Seven and twenty animals, confined to a space which the utmost attention was scarcely sufficient to keep habitable, constantly quarrelling and fighting for dear life, exposed to sun, dew, snow, and wet generally, and without a chance of a run ashore—it was not to be wondered at that they began to show signs of disease. The first attacked was a young female twenty-five days on board; she had a fit and died in thirteen days. Others became attacked. One was summarily shot; one ran away, and was seen no more; two were accidentally drowned; seven died from the disease; six recovered; one died mad.

Of the whole number, twelve only were under medical treatment; one had rabies and died, one recovered so far as to have two litters of pups, and then died ten months after her first fit and two or three days after her last litter; two fell into the water when in fits and were drowned; two died, notwithstanding every thing was done to cure them, and six recovered and were landed at Disco. . . . The treatment found most beneficial was calomel, followed in some cases by croton oil and solution of morphia, the best of water, and good food. Those which were not kicked or cuffed behaved as socially and decorously as if brought up in a cottage."

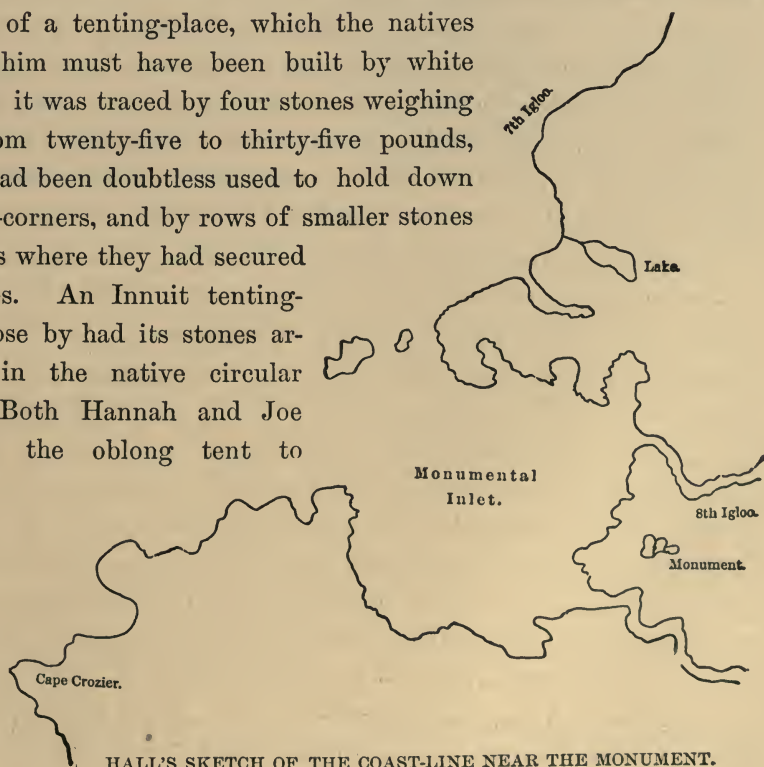


MONUMENT FOUND BY HALL,
Lat. $69^{\circ} 47' 5''$ N., Lon. $85^{\circ} 15'$ W.

forlorn hope of reaching a ship at Cumberland Inlet in which they might return to England.

But from the top of Cape Inglefield not a sign indicated that white men had been there, nor could the cache of which so much had been said be uncovered. Lailor and Ebierbing, for many hours, labored hard in cutting down with their iron snow-knives into the spot pointed out by the native, Koo-loo-a, as its site, without the least sign of a cairn. A discovery of some interest was, however, made in the

remains of a tenting-place, which the natives assured him must have been built by white men, for it was traced by four stones weighing each from twenty-five to thirty-five pounds, which had been doubtless used to hold down the tent-corners, and by rows of smaller stones in places where they had secured the sides. An Innuut tenting-place close by had its stones arranged in the native circular form. Both Hannah and Joe believed the oblong tent to



HALL'S SKETCH OF THE COAST-LINE NEAR THE MONUMENT.

have been the white man's work, and Hall left the spot, convinced that he had found a monument and tenting-place made by white men.

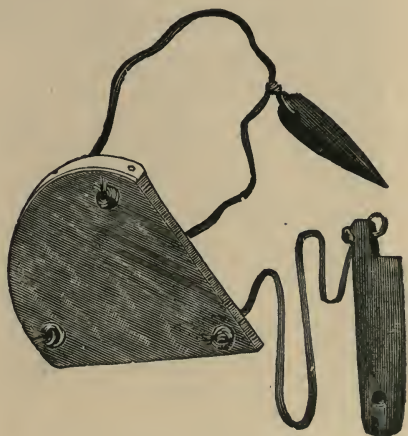
SURVEY OF THE NORTHWEST COAST OF MELVILLE PENINSULA.

From astronomical observations and compass bearings he determined the coast-line between Cape Inglefield, the most western point of the Strait sighted by Parry, and Cape Crozier, the most northern reached by Rae in 1847; by which survey he may be justly said to have filled up this broken line of the Admiralty chart for the northwestern part of Melville Peninsula, at and below the western outlets of Fury and Hecla Strait. This was, at least, a liberal compensation for the disappointment keenly felt on leaving the spot without records or closer traces of white men. On the 18th of the month following he visited Parry's Gifford river for the objects already named, but discovered nothing of interest except some traces of occupancy probably by Parry's men. Returning to Ig-loo-lik he hastened his preparations for setting up his tent again on the bay, which he reached on the 26th. His Astronomical Observations made at this season are included with those made at other points in Appendix I. of the "Second Arctic Expedition," published by the U. S. Senate 1879; the notes introducing that appendix exhibit the character and condition of the instruments employed.

The journals of the two remaining summer months of 1868 are filled with the accounts of salmon-fishing and deer-hunting, the unfortunate shooting of one of Hall's five hired men, and the capture of another whale. By the use of an excellent net which he had brought from home, large numbers of the salmon were caught, the full weight of one hundred and seventy-five captured on one day exceeding one thousand pounds. The unhappy man, Patrick Coleman, who seems to have placed himself as the leader of a mutinous party, lingered after Hall's fatal shot for the space of two weeks, during which time every effort was made to save his life by careful nursing; the other four hired men shipped for home on the first two whalers that came into the bay.

Still, even without the companionship of white men, Hall determined to pass another Arctic winter in the long-cherished hope of

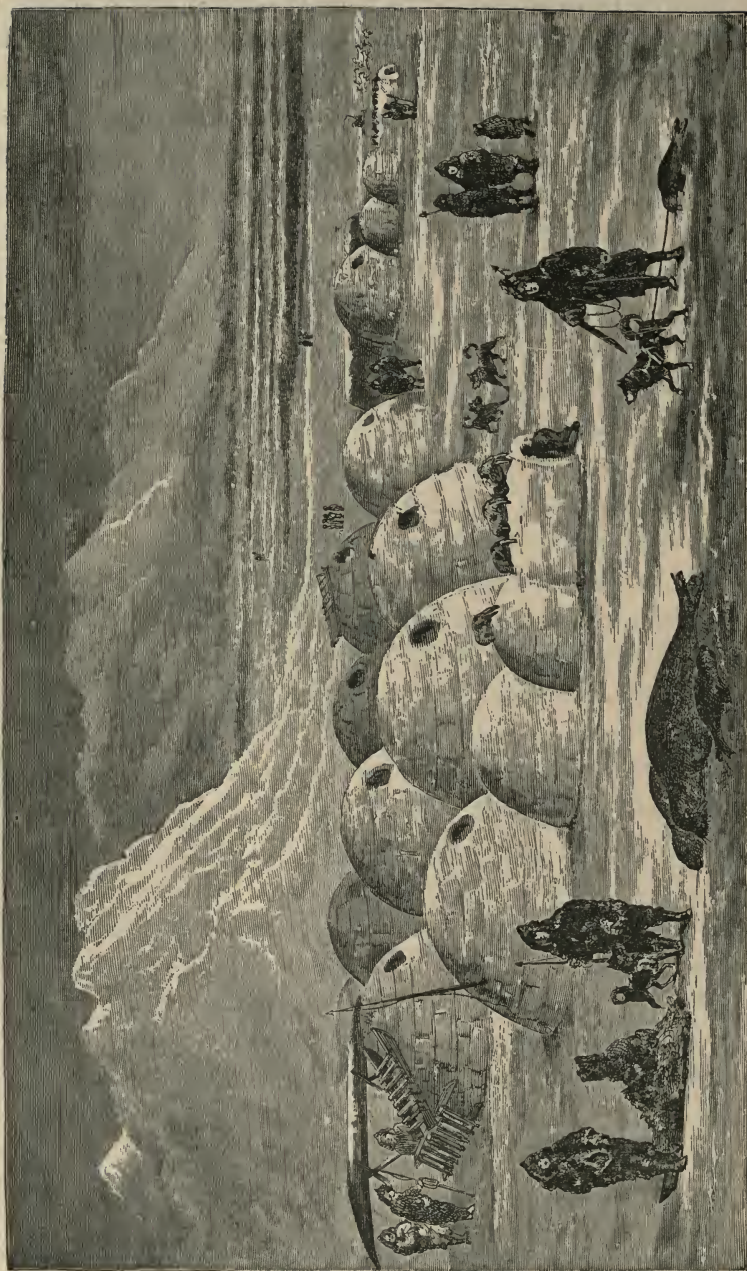
reaching King William Land. By the close of August he had succeeded in the capture of another whale, the blubber of which was cached for fuel, the skin for food, the meat for the dogs, and the bones for renewed shipment to the United States. During the month of November he made a journey to Lyons Inlet, surveying portions of it; having made on the two journeys of the year, the discoveries of a new inlet, lat. 67° N., lon. $84^{\circ} 30'$ W., a few miles north of Norman Creek; a bay on the west side of Fox Channel, lat. 69° N., lon. $81^{\circ} 30'$ W.; a lake twenty-five miles in length, lat. $68^{\circ} 45'$ N., lon. 82° W.; and a second lake, in lat. $69^{\circ} 35'$, fifty miles in length, with its two outlets; the lake running parallel with Fury and Hecla Straits. Also, two islands; one northwest of the west end of that strait and the other at its east end. What he considered accomplished of the most importance geographically was the completion of the coast around the north side of Melville Peninsula.



HALL'S BOAT-LOG.

The winter of 1868-69 was spent with more than usual comfort. The natives were better supplied with stored provisions and had better success in the hunt during the intervals of open seasons. Hall's intercourse was not again broken by estrangements on their part, but he had much to bear from their too great intimacy, their frequent and long protracted visits to his igloo, which was at times filled with men, women, and children to the youngest, all jabbering, crying, humming, begging and stealing. They gave him some compensation, perhaps full recompense — by their supplies of the walrus and seal. His visits to their village were frequent. He remained free from a touch of scurvy as indeed he was throughout all of the three expeditions, of nearly nine years.

By March 21, 1869, he and Ebierbing had dried nearly two hundred pounds of venison, made up new furs for the spring journey and



SNOW VILLAGE.

From Hall's "Arctic Researches." Harper Brothers.

moulded a full supply of ammunition. They were by no means assured of the friendly disposition of the tribe among whom they were to search for the lost records and learn something of the lost navigators, but on the 22d made an advance deposit for the new journey. Hall was restless under the delay caused by a severe gale.

THE SUCCESSFUL JOURNEY BEGUN MARCH 23, 1869,—KING WILLIAM LAND REACHED.

“Now for King William Land,” was again the note-book inscription of the day. The party of natives numbered five men and five females; one, an infant in the hood. Despite the past experiences of Innuity delays, it was now either by their help or no advance whatever.

The loads of the sleds were, of necessity, heavy, the gross weight of one being nearly two thousand eight hundred pounds, and of the other two thousand five hundred, and as this would be exclusive of the weight of any of the party who would ride, the dogs would be closely pressed. The runners of the sleds were shod with the jawbone of the whale; and the usual expedients of icing when necessary, and of substituting the man-help for the dog, were expected to have place on the route. The foot gear had been well provided.

On the 31st when the party neared Cape Lady Pelly, musk-ox tracks were found to be numerous. The sleds needing *re-icing*, the mixture was made up of snow-water and urine, forming a more durable compound. The cache left in 1868 at Cape Weynton was found undisturbed; part of the stores were used, the remainder were re-deposited for the return supply. The journey now was westward. But the Innuity delays from this moment renewed themselves. Some of them rode lazily on the sleds, one was asleep in midday. Hall seemed to have wondered that none cared for his search, but, at the same time he wondered that the party made what advance they did, as the sledges frequently sank down full six inches, and at times were completely blocked. The route was with difficulty determined by any observations; dependence was therefore necessarily laid upon native experience and instincts. At one of the “encampments,” when desiring to record its location, he wrote:—

"It is no wonder that my dead reckoning may be faulty with but the aid of a small compass across the plains of an unknown country, snow-clad; thick weather; much of the time snowing; no object whatever in sight to aid in making straight courses; large variation of compass; no sight of sun, moon, or stars by which to determine latitude or



SETTING OUT FOR KING WILLIAM LAND.

variation of the compass,—I can determine by astronomical observations only, the errors which are possible."

On the 10th of April the dogs scenting new igloos, were immediately inspirited to make a very rapid run. They overturned sleds and travellers. The native guide, Papa Tewa, became evidently alarmed, but Hall urged the party forward. Apprehensions of a hostile meeting had not been wanting, and Jerry was sent cautiously forward, but he soon reappeared with a signal of peace from the newly found huts. From one of them an old man and his wife made their appearance, armed each with a long knife, but offering a welcome; the man proved to be a

brother of the old chief whom Hall had met two years before. In his hut were found several articles which, he said, had come out of a ship sunk on *Kik-i-tuk*, King William Land. He told much the usual story of the ship and of the men who had perished.

These people were miserably wretched in their poverty. They had lost nearly all their dogs by the oft prevalent disease which destroys them in numbers, and had no food whatever, except a few seal bones with putrid meat upon them, nor had they fuel for fire. Hall's company barely made out to obtain some drinking water by the help of a little fire shrub (the *Andromeda tetragona*) gathered from beneath the snow. Hall fed the hungry in the hut.

But from some news communicated to Hall's party, they became yet more alarmed, still he persuaded them to go forward. On the 18th of the month they encamped on Simpson's Lake in lat. 68° 30' 22" N., lon. 91° 31, W., where a musk-ox was secured and a full supply enjoyed by all. Hall remarks that the greater part of what was killed went down the In-



HALL'S BELT AND TABLET-COVERS FOR HIS NOTES.

nuit paunch; "and as for one of them, Nu-ker-zhoo, he is a regular hog, eating more than any two others, feeding his dog on the choicest pieces, and having no shadow of regard for others."

May 30, more igloos were seen and proofs of their being occupied; another advance was made, further preparations being taken for defence. Within one hundred and fifty fathoms of the huts, two of the party were sent forward, knives in hand; but they found the strangers willing to be friends. The man, of whom Hall had more than once heard, as the one knowing the most about the ships, In-nook-poo-zhee-jook, hastened to meet him.

The first question asked was "Nou-ti-ma Aglooka?" (where is Crozier?) and the first thing shown was a large silver spoon with an eel's

head crest — Franklin's. An encampment was immediately made, the natives cutting out their snow-blocks for the igloos with knives which had come from the ships. The hut was full of things from them, and Hall readily made his purchases. The old man sketched for him the land he was to visit, directed his route, and fed him on accounts of the Franklin men. Taking him upon his sled, Hall went forward to find a place on which some white men were buried; the native led him by a straight course to the desired spot on Todd's Islands.



IVORY KNIVES.

On one of these islets he fixed himself, and immediately set out to search for the graves, finding, however, part only of a human skeleton. Crossing the second day to the mainland, after hours of weary labor in digging down into the snow covering, his attendants found one entire unburied skeleton; over this a pile was built up, but the gale and the hardness of the snow debarred further search, nor was greater success the result of continued search at other points. During his stay with the natives on this visit, he felt satisfied that he could now account for probably seventy-nine of the one hun-

dred and five men of Crozier's party from the abandoned ships. They told him that Ag-loo-ka (Crozier) had come along near their tents, his telescope hung about his neck, and his men dragging two boats; he had a gun in his hand, but on seeing him lay it down, the Innuits laid down their spears; he told them about the ice destroying their ship, and of the men who had died, and said that he was going to *Iwillik* (Repulse Bay), making motions with his hands in that direction. They also said that the Innuits had left them, knowing that they were starved men.

Hall reproved them sharply for deserting Crozier. It would, however, seem probable that they did so under the fear that Crozier's larger

party would starve them out; and here the remark seems to force itself, that the terrible loss of Crozier's large party must have been the result of the failure to secure, before the ships sank, enough of condensed provisions for their land journey, and of his not having native helpers as part of his crew, on whom he might have depended as later

From what I can learn no
one of Sir John Franklin's Cr.
ever reached that (Montserrat)
Island.

The natives here - the - people
has just told me by word of mouth
that Salmon bones were found at
the landing place north of Riffin
river where bones of Salmon
that the white men had caught
& eaten there. Much information
is thus obtained & noted as
we are riding along on our
sledge.

FAC-SIMILE OF A PAGE OF HALL'S FIFTY-TWO NOTE-BOOKS
OF THIS JOURNEY.

explorers have always done for guidance and for success in the hunts. This success might have been looked for from experienced Innuits at the season of the fatal march, the middle of June.

RETURN TO THE BAY.

The final return journey was now begun. All the natives who had gone with Hall were anxious to be safe back at Repulse Bay, Nu-ker-zhoo declaring that unless they started back in four days, the ice and

snow would be off the sea, and they would have very great trouble. The journey to Terror Bay, on the west side of the island, where it was said a tent had once been found, the floor of which was completely covered with the remains of white men, and even a shorter journey to Point Richardson were therefore given up. The return party consisted of fifteen persons with a team of eighteen dogs, one of these not being permitted to do work for some days for having eaten up a babe which a native woman had thrown away on finding it was not a male. Innook-poo-zhee-jook had proved so skilful a guide that Hall now took no account of his courses, but gave himself up to the noting down of whatever further accounts of Franklin men he could glean. The cut represents a page of these notes written on the rough sled.

Just before reaching Cape Weynton, Papa Tewa shot a mother deer, which fled, leaving the fawn to have its life "footed out," as the term is, for pressing down heavily one foot over the young heart. From this point the chief items of interest were in the repeated and successful hunts of the musk-ox. The natives were eager for the hunt, and Hall himself went in with them, killing three with two balls, which were found lodged in the third; Hannah killed four young ones.

The striking points of these hunts are illustrative of Innuît customs and of the habits of the ox when attacked. The fight was at the place where two bands were successively seen. When the first of these was surrounded, as soon as they perceived that the dogs were slipped, they formed into their usual one circle of defence, "a musk-bull battery of nine solid battering heads and twice the number of sharpened horns." The dogs were quickly at these heads, barking and jumping back and forward, while the hunters made no haste to advance, for they knew that the bulls would stand their ground all day if no other enemies came.

"After a few minutes' watch of the movements of dog versus bull and bull versus dog, the old hunter, Innook-poo-zhee-jook, went forward to within twelve feet of a large bull, carrying a lance which had a line attached by which he could draw it back; but at his second throw, the wounded and infuriated bull made a fearful forward plunge, from the effects of which the hunter and his companions escaped only by a very

timely jump to the left. The bull was soon again brought to bay. Ou-e-la then pulled trigger on another noble bull of the circle of defence, and Pa-pa shot the one which had been lanced, when at the noise of these guns the whole circle bolted away, except two, who stood their ground, side by side, long after the whole fight was ended, and even when the dogs were driven away from them and stones had been thrown."

"Instead of moving, each of these two kept throwing his massive head down between his forefeet, rubbing the tip of each horn against the foreleg as one would rub a razor on a strop. This is the animal's habit unless he finds himself, when attacked, near some large stone which he may use for the same purpose of sharpening his horns. The work of death upon the others of this band and upon the second band, was completed by the rest of Hall's men with guns, spears, and the bow."

The number of oxen killed on this return journey numbered seventy-nine; their skins weighed nearly nine hundred pounds. As many as eighteen deer also were taken, and the supply of small game was as good. Hall felt prompted to write that if Crozier had enjoyed the facilities which he now had, the lost men would have been saved. Before the close of the month his party were congratulating themselves on the abundance laid up for feasting and on an entire surrender of themselves to repose.

In a letter to Mr. Grinnell to be forwarded if occasion offered before his own return to the States, he summed up the results of this visit especially as to the finding of some of the remains of the missing navigators, and determining anew that the "Erebus" and "Terror" had indeed made the long desired northwest passage, and had perished there.

The substance of the letter was, that he had intended to make this journey the season previous, but had visited Melville Peninsula with the ardent expectation of rescuing there some of Franklin's lost companions, and that on his late journey to King William Land he had found the following traces of Crozier's sad history:—that late in July, 1848, with about forty men he had passed down the west coast near Cape Herschel, his party dragging two sleds; that just before reaching

the cape he had encamped near four families of natives who, in the night, had left the suffering party; that the skeleton of one of the party found by McClintock had never been seen by the natives; that east of Pfeffer River on the sea shore two had died and been buried; that five miles eastward, another had been buried; that on Todd's Islet were the remains of five; that on the west of Point Richardson, Poo-yet-ta, known to Sir John Ross, had seen an awning-covered boat with the remains of more than thirty; and that a little way inland from Terror Bay a large tent was known to have had its floor covered with remains.

Hall further wrote that he had tried hard to accomplish more, be-



PARTS OF SIR JOHN FRANKLIN'S DESK.

Exhibited at the U.S. Centennial (deposited at the Smithsonian).

lieving that he could have gathered up the remains of many more of the unfortunate men, and might have recovered the manuscript records spoken of to him as deposited in the vault at Cape Victory, but that not one of his company would on any account whatever remain with him for a summer search, for which refusal, he did

not blame them, knowing as he did the character of the strange natives. He said:—

“I could readily have gathered great quantities of the relics of the expedition for they are now possessed by natives all over the Arctic regions from Pond's Bay to Mackenzie River; I had to be satisfied with taking upon our sleds one hundred and twenty-five pounds total weight including part of one side of a clinker-built and copper-fastened boat, a small oak sledge-runner, piece of the mast of the ship which made the passage, a chronometer box with the queen's broad arrow engraved on it, a mahogany writing-desk, and many pieces of silver plate, forks and spoons, parts of watches, and knives bearing crests and initials of the owners. The ship which made the passage with five men on board was found by the Ook-joo-lik natives near O'Reily Island lat. 68° 30' N., lon. 99 W., early in the spring of 1849.”

AN ARCTIC SUMMER.

The temperature during July was high, and rains and storms, frequent, the storms coming generally from S.S.E. and N.E. The lowest readings of the thermometer at night were from 40° to 46°, and the highest at noon from 60 to 71°. A storm on the 19th was accompanied by sharp lightning. Hannah told Hall that in her country lightning was always fatal to red dogs; her people always killed them when young. The plains were now purple with the wild saxifrage (*saxifraga oppositifolia*); its beautiful flowers, followed by those of other floral tribes, clothed the earth with carpets of gold, crimson, blue, white, pink, and straw-color. The *Andromeda tetragona*, so often used as the shrub fuel, itself bore pretty flowers. Hall's collection of wild flowers embraced a dozen varieties. Mosquitoes were very numerous and persistent; a walk on shore seemed unbearable, unless every exposed part of the body was covered with a defence. Hall's was coal-oil.

He was now for some weeks solicitous as to his return home. Conscious that he could accomplish nothing further of research, he purposed to publish the results of his protracted Arctic experience, and then make a voyage to the Pole, on which subject he had long meditated; then *again to return to King William Land*. The expression of such purposes comes strangely from one whose sledge journeys only during the five years now ended, footed up more than four thousand miles. Nothing but the extreme of a strange fascination with an uncouth life can explain this. He says himself that whatever food the natives delighted in delighted him; that he had enjoyed a grand good feast on the kind of meat he had been longing for, "the deer killed last fall, rotten, strong, and stinking, and for these qualities excellent for the Innuits and for the writer." This, however, must not be taken as an indication of any sympathy with the low and immoral practices he was compelled to witness. Unable to restrain the demoralization brought on by large successes in the hunts when the Innuits ate three-fourths of their food for the mere pleasure of eating, he was yet more pained by the fact that the hunts were made occasions for promiscuous concubinage. This was the

constant practice. Hannah said she "would rather die right away than stay at the bay."

While he was hoping for the sight of a whaler, he succeeded with native help in gumming nearly eight hundred pounds of bone from the whale cached the year previous, on the sale of which and of his musk-ox skins he was expecting to repay some of the costs of the voyage. But now the question of the possibility of his being compelled to attempt in his frail boat a voyage to York Factory, Hudson's Bay, without a chart, was happily settled by the arrival of the "Ansell Gibbs" of New Bedford, on board of which vessel he took up his quarters with Eskimo Joe, Hannah, and her adopted child Pun-na; at Ig-loo-lik two years before he had bartered a sled for this child, to console Hannah for the death of her own babe.

The whaler left the Welcome August 28th, passed through Hudson's Bay and Straits without the occurrence of any incident of unusual interest, and came into the harbor of New Bedford, Mass., September 26, 1869.

When nearing the lighthouse of Nantucket, Mass., Hannah and her child doffed their native dresses for those of a civilized land. At the Parker House, New Bedford, Hall made his last journal entry, September 26, 1869, 2 P.M.: "How thankful to high Heaven ought my poor heart to be for the blessed privilege of again placing my foot upon the land of my country."

He immediately telegraphed his arrival to Mr. Henry Grinnell, expressing his hope of seeing him in a few days in New York, and within the next month, was at work in that city for his North Polar Expedition of 1871.



HORNS OF MUSK-OX AND DEER SHOT BY HANNAH.

CHAPTER VIII.

THE NORTH POLE EXPEDITION OF 1871.

HALL'S EARLY DESIRE TO REACH THE POLE — LECTURE IN WASHINGTON — APPROPRIATION BY CONGRESS — THE "POLARIS" SAILS FROM NEW YORK — ARRIVES AT FISKERNAES — U.S.S. "CONGRESS" AT GODHAVN — HANS HENDRICK — TESSUISSAK — NORTH WATER REACHED — THE "POLARIS" BESET AT 82° 16' — CONSULTATION — DRIFT TO THE SOUTH — ANCHORED TO PROVIDENCE BERG — WINTER QUARTERS — SLEDGE JOURNEY — DEPOSIT IN THE CAIRN — HALL'S DEATH AND BURIAL — WINTER OF 1871-72 — AURORAS — RETURN OF THE SUN — THE "POLARIS" LEAVES THE HARBOR — DRIFTS SOUTH — THE SEPARATION — THE SHIP LEAKING — HOUSE ON THE FLOE — DRIFT OF THE FLOE PARTY AND RESCUE — RELIEF SHIPS SENT FOR THE "POLARIS" — DELONG'S CRUISE — RESCUE OF THE "POLARIS" PARTY BY THE "RAVENSCRAIG" — HALL'S MEMORIALS — MEDAL AWARDED — TABLET PUT UP BY THE ENGLISH EXPEDITION — THE ESKIMOS KUD-LA-GO, JOE, HANNAH, OUSE-GOONG, AND ABBOT — GRAVES AT GROTON, CONN.

DURING each of Hall's two residences among the Eskimos he repeatedly spoke of his hope to lead an Expedition toward the Pole; writing to a friend as early as 1863, "My third voyage will be to the northern axis of the great globe." He renewed like expressions in the notes of his Second Voyage, and wrote to the Committee of U. S. Senate on Foreign Affairs, March 29, 1870, that for years he had held this in mind.

In the beginning of that year, on a visit to Washington City, he had called upon President Grant, and, not long after, lectured before him in response to an invitation signed by the Vice-President and members of the Cabinet and of Congress then in session. After a laborious and anxious season of suspense, he succeeded in obtaining an appropriation for an Expedition to the North Pole, in the sum of \$50,000, by a clause incorporated in the Legislative, Executive, and Judicial Appropriation Bill, approved by the President July 12, 1870. Eight days afterward,

he received a commission as Commander of the Expedition, which required him to report to the Secretaries of the Navy and of the Interior Departments for detailed instructions. The Act authorized the Secretary of the Navy to employ any suitable vessel in the Expedition, and provided that the scientific operations should be prescribed in accordance with the advice of the National Academy of Sciences.

The vessel selected as available for the purpose was the steamer "Periwinkle," a tug which had seen some service in the war of the rebellion; her burden was three hundred and eighty-seven tons. After being newly and heavily timbered and strengthened in her side planking, the bottom was thoroughly calked, then double-planked, calked and coppered. Everything else deemed necessary for safety and comfort was also done with such care that "no vessel, even if especially built, could have been better adapted to the service."* Launched at the Washington yard, April 25, 1871, she was named by Hall the "Polaris," under which name she sailed for New York, June 10, and, after further equipment at the Brooklyn yard, proceeded to New London, June 29, and sailed for the Arctic Zone July 3.

Her complement of officers, including the scientific corps, was:—

C. F. Hall, commander.

S. O. Budington, sailing-master.

George E. Tyson, assistant navigator.

H. C. Chester, mate.

William Morton, second mate.

Emil Schumann, chief engineer.

A. A. Odell, assistant engineer.

N. J. Coffin, carpenter.

Emil Bessels, surgeon, chief of scientific staff.

R. W. D. Bryan, astronomer.

Frederick Meyer, meteorologist.

The crew consisted of fourteen persons, and the two Eskimos, Joe and Hannah, were again Hall's companions.

* This endorsement of the fitness of the "Polaris" for Arctic service, quoted from the late Admiral Davis, is a sufficient answer to the contrary representations made by some of the under officers of the ship, and on that authority only copied in foreign pub-

Secretary Robeson's instructions to the Commander advised him that he might expect additional supplies through a transport which he would meet at Holsteinborg, or at Disco, and, that after receiving these he should proceed across Melville Bay to Cape Dudley Digges, and thence make all possible progress with vessel, boats, and sledges toward the North Pole, using his own judgment as to the route and the location of his winter quarters. The operations of the Scientific Department being required by law to be in accordance with the advice of the National Academy, he was furnished with a full copy of their suggestions, and instructed to give to the head of the Scientific Corps every facility in carrying these into effect. Dr. Bessels was to remain chief of this corps in the event of the death of the Commander, and Captain Budington to continue as the sailing and ice-master, and control and direct the movements of the vessel. The "Polaris" was provisioned and equipped for two and a half years, but her cruise was not restricted to this period, if Hall's objects called for an extension of time and his supplies would hold out. Appreciating the opportunities which might offer for the extension of the knowledge of geography and of other sciences, the Secretary added to his instructions relative to the work of the Scientific Corps, that any and all individual observations or collections made by persons outside of the corps should be considered, as is usual, public property, and placed under the charge of the chief of the Scientific Department. The positions of capes, headlands, and islands, and the coast-lines, and the observations of tides and currents, with the making of surveys, were also objects of the Secretary's instructions, besides the detailed suggestions of the Academy on these subjects, furnished as of equal authority.

"Hall's own views of Arctic investigation," says Admiral Davis, "were much more comprehensive than might be inferred from the means and material employed in his previous Expedition. His own plan embraced two vessels, together with a large supply of dogs and sledges. If he could have carried out this plan, he meant to maintain

lications. Admiral Davis used this language to express the result of his inquiries at the Navy Department and at the Washington Navy Yard, at which yard an outlay exceeding the sum of \$90,000 had been expended on the "Periwinkle."

an occasional communication between himself and the civilized world, wherever he might be. And there is no doubt that, for the accomplish-



FISKERNAES,

ment of this, he would have turned to a good account his familiarity with Eskimo life, language, and customs. Thus he would have been

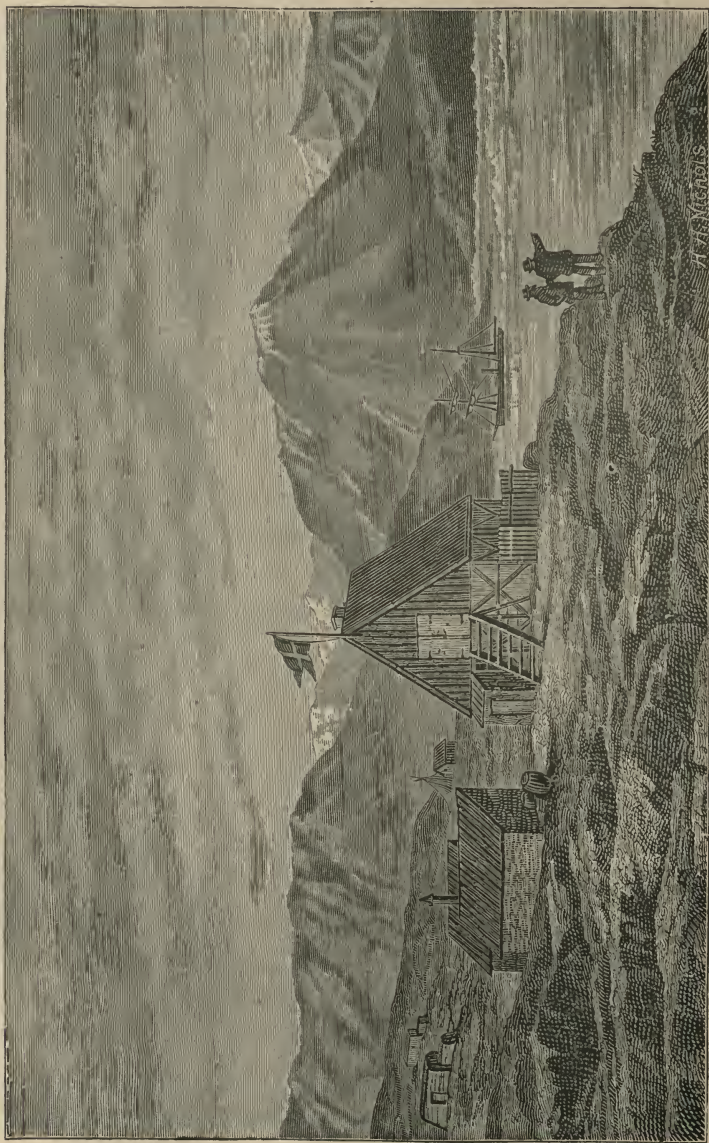
able not only to report progress, but to receive additional aid from home. Such was his expectation. If we carry our minds back to the history of Arctic Exploration, we perceive at once how many evils are avoided, and how many advantages reaped by this joint co-operation.” *

On the voyage to Newfoundland the “Polaris” encountered heavy weather and frequent fogs. On the 10th she made Cape Race, and on the 12th anchored at St. John’s. Hall here again received every courtesy and attention from the authorities of the Province; in turn he entertained the Governor and his suite. The ship left St. John’s for Greenland on the 19th, and on the 27th had the first sight of high snow-covered peaks, and of welcoming natives in their *kayaks*. The same day the “Polaris” dropped anchor in the harbor of Fiskernaes, where she was visited by Governor Schoenheidter, and on the next day by the greater part of the population, especially by the women. “Some of these were thought to be handsome; all were gayly dressed, wearing boots of well-tanned seal-skin, which reached above the knee, seal-skin trousers tastefully ornamented with needle-work, and jackets covered with bright cloth and trimmed around the neck, wrists, and lower edges with fur and pretty bead ornaments.”

After a visit by some of the party to the Moravian Missionaries at Lichtenfels, who, at this place, have care of more than half of the whole number of Eskimos of Greenland under them, the ship left the harbor and anchored, on the 31st, in Holsteinborg. At this port a Swedish Scientific Expedition under the command of Baron Von Otter, now on its return voyage, brought Hall the good news from Upernavik, that the season was promising, few icebergs having been seen between Holsteinborg and Disco, and none recently between Disco and Upernavik. Baron Von Otter received Hall’s first dispatches for the Secretary of the Navy. His ship expected to stop at St. John’s. The “Polaris” awaited the arrival of the U. S. ship “Congress,” the transport which was to renew his supplies and bring further instructions,

* Narrative of the North Polar Expedition of 1871,” edited under the direction of the Secretary of the Navy, by Rear-Admiral C. H. Davis, U. S. Naval Observatory, 1876. From this volume chiefly the present chapter has been prepared.

but left the harbor August 3, and, under the guidance of a native pilot, twenty-four hours afterwards, was safe in the harbor of Godhavn. On



LICHTENFELS.

the 6th the Commander, accompanied by several of his people, attended divine service in the neat but very plain chapel of the Moravians.

Hymns were chanted, passages of the Scriptures read, prayers offered, and a sermon preached by the Catechist in the absence of the regular clergyman. The Chief Inspector of the District, Mr. Smith, who had now come to Godhavn in response to a message sent by a boat journey under Mate Chester to Rittenbeck, was visited by Hall and by Capt. H. K. Davenport, U.S.N., who had arrived in command of the transport, the "Congress," and whose officers on landing were saluted by a battery of six 6-pounders, which was returned by the "Congress," the Danish flag being hoisted at her mast-head. The Inspector very cordially responded to the letters of the Secretary of the Navy, presented by Capt. Davenport, consenting to receive and care for in the Government store-house, the stores and provisions for the use of the Expedition, — the "Congress" had brought supplies beyond present necessities. Before the ship left the harbor, Captain Davenport gave "some judicious instructions and advice to the crew of the 'Polaris,' which, considering the heterogeneous character of the ship's company, was well-timed"; had it been followed, some later difficulties might have been prevented. Rev. Dr. Newman, of Washington, Rev. E. D. Bryan, of Carbondale, Pa., and Capt. James Budington, of Groton, Conn., (the salvor of the British ship "Resolute,") passengers on the "Congress," returned in her. The "Polaris" left Godhavn on the 17th, and the next day Svartehuk was on the starboard beam, distant eight miles; and at 1 A.M. of the 19th the ship anchored in Upernavik, having made a run of two hundred and twenty-five miles in thirty-three and a half hours. The inhabitants were all asleep, and were not easily awakened; the sun at midnight had been but four degrees below the horizon, and it was then but one hour and a half to his rising.

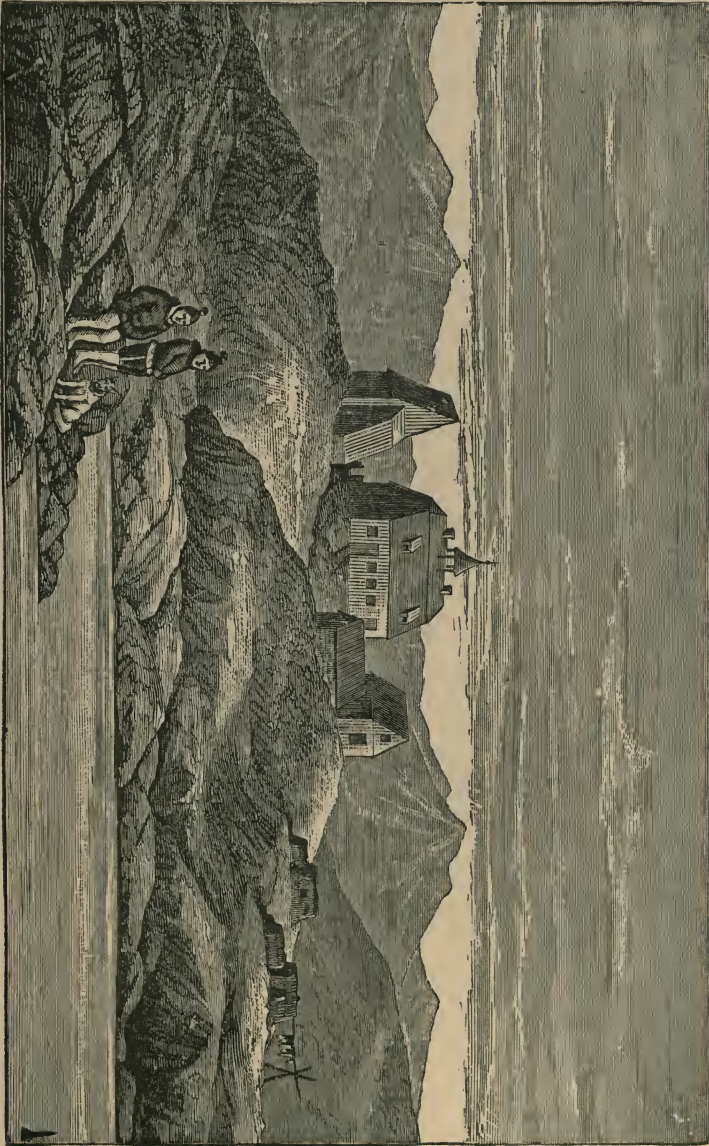
Mate Chester was now dispatched in a boat to Pröven, fifty miles southward, to bring Hans Hendrick to the ship, and a kayak was sent the same distance northward to procure Jansen of Tessuissak, whose services, however, were not secured. Hans Hendrick contracted to serve as dog-driver and servant at a salary of fifty Danish dollars per month. His wife and three children came on board the "Polaris" with their luggage of bags, boxes, skins, cooking utensils, tools, implements.

of the chase, and three or four puppies whose eyes could scarcely bear the light. These accompaniments, as on the Expedition of Dr. Hayes, proved a nuisance; Hans, a most useful helper. He did not recognize Morton until the latter had pointed out some scars on Hans' right hand, the remains of injuries from a powder explosion on the shore of Kennedy Channel. Twenty years had passed since the two had made for Kane the memorable sledge journey to Cape Constitution and the reported "open Polar Sea."

The Upernavik settlement consists of some twenty-two houses inhabited by sixty Eskimos. They appeared even less cleanly than those in the more southern settlements. Just back of the settlement on the slope of the ridge, is a graveyard, distinguished by crosses, head-boards, and little inclosures marking the graves. "The absence of vegetation, the want of method in the arrangement of the graves, and the dismal aspect of the fragments of unsightly rock covering the surface, added greatly to the sadness and dreariness of that northern cemetery. The hardness of the ground making it necessary to place the coffins on its surface, and cover them with stones, the remains in the course of time often become exposed." At this settlement, observations for position were made and its magnetic elements determined; collections of the fauna and flora of the surrounding country were obtained and its geology studied. Photographs were also secured of Eskimo life and habits. The "Polaris" took on board five tons of coal, and a large number of seal and dog skins; and now twelve dogs, added to a pack made up at St. John's, began their hideous howlings on board ship. On leaving the harbor, dispatches were again made up for the Secretary of the Navy, and placed in the hands of Governor Rudolph, who sailed on the 21st for Denmark in the brig "Julianhope."

August 24, Hall was again at sea, having left his last stopping-place, Tessuissak. He had failed to secure the services of Jansen to accompany him on the cruise, but was skilfully piloted by him through the narrow channel and the islets; and he had again increased his dog teams, and seems to have been at this hour of "striking for the Pole," fully satisfied with all the equipments of his ship and the promise before him. He wrote that the prospects of the Expedition were fine,

more so than he had ever hoped or prayed for. The fog which even then shut down upon him was to him no omen of evil.



TESSUISAK.

For a number of days following he had indeed reasons for being strengthened in every ground for encouragement. His advance was

more rapid than had been secured on any former Arctic voyage. For the first thirty miles of her course from the harbor the ship was headed due north, careful lookouts being posted on watch for the coast dangers as the fog continued; at noon of the 25th, when it lifted, all sail was set to a freshening breeze and Cape York was soon sighted. Icebergs were numerous, and the pack-ice more than once encountered, but on running westward along its southern edge, the "Polaris," after some buffeting and working through the pack, stood on a course about N.N.W. true, and on the night of the 26th left the Cape behind her. The north water had thus been favorably reached in about forty-eight hours.

Crowds of walrus were now seen blackening two floe pieces which covered areas of half a mile each. They were lazily sleeping, and showed no signs of apprehension at the approach of the ship further than to roll their heads lazily about. Huddled closely together and offering easy range to each floe as the ship passed between them, they were twice fired at by Eskimo Joe, but with the success only of wounding. Captain Hall was unwilling that the ship should stop for the capture of any.

Much ice was again found off the northern entrance of Wostenholme sound; it was the bay-ice of but one winter's growth, but where it was closely packed, the "Polaris" had a difficult task to get through; yet at midnight of the 26th she had left Fitz-Clarence Rock and was opposite Cape Parry. In the morning of the 27th she was compelled for *the first time* to stop off the western shore of Hakluyt Island.

For the ice now changed its character, being found in the solid and permanent packs which had accumulated in bays and straits and around the outlying islands. Yet the ship soon made new advances, Sailing-Master Budington succeeding from his long-matured Arctic experience in selecting the weakest points for the attack and working through every favorable lead. At 3 P.M. he was opposite Cape Alexander; at five, he had passed Littleton Island; and at eight, crossed the parallel of Kane's Rensselaer Harbor. Smith's Sound was also found open. The "Polaris" was already in higher latitude than that reached on this route by any former expedition.

When within five miles of Point Joy on the 28th the ship had rounded the northwestern prolongation of the pack, she was in com-

SHOOTING WALRUS.



paratively open water, and in sight of a small bay which seemed to be suitable for a harbor. Hall was disposed to put into winter quarters

here and then push forward toward the Pole by sledges on the ice, but an examination of the bay by himself and Mate Chester showed that the water was not quite deep enough; the "Polaris" then resumed her course. Steaming another hour through the entrance of Kennedy Channel she passed Cape Frazer, and running along the land at a distance of five miles, rapidly passed Capes Norton Shaw, McClintock, and Lawrence. On the 29th Cape Leiber was distinguished on the western coast; and at 1 P.M. the ship entered a strait some twenty-five miles in width and worked her way slowly through it despite of the increasing thickness of the floes and the force of the currents. During the night and for several hours in the early part of the 30th, she was kept moving toward the north, passing immense ice-fields which increased with the latitude, but at 6 A.M. she had reached the northern *limit*. The ice was so compact that it was impossible to force the vessel through; it was firm from one coast to the other; so far as the eye could penetrate the fog, there was no open space to the north and no sign of an open passage. Hall was in front of an impassable barrier. He had, however, gained a point which his observations gave as $82^{\circ} 26'$, lat. N. from which determination the results of Mr. Meyer's careful computations differ but ten minutes.

THE DRIFT.

But it became impossible to keep the "Polaris" at this point; she drifted from it with the current, and on the 30th was secured to a large berg, with which she continued to drift southward until, on the ice opening somewhat, she was cast off and was headed for the eastern shore of the channel, where a harbor was promptly sought.

In this effort Hall was twice disappointed, and yet it seemed evident to all that it was useless to attempt to force a passage along the eastern coast of the channel. After a consultation with Budington, Chester, Tyson, and Dr. Bessels, he decided to make an attempt to get to the westward, but if unsuccessful, to seek immediately a harbor on the eastern coast of the strait. Dr. Bessels had coincided with him in this decision, in the hope that a passage might be found toward the north along the land on the west coast, where sledge-travelling in the



THE "POLARIS" PASSING FITZ-CLARENCE ROCK, AUG. 26, 1871.

spring might be more practicable. This was Hall's great desire as it had been that of Dr. Hayes, who, however, as has been noted, had failed in it ten years before.

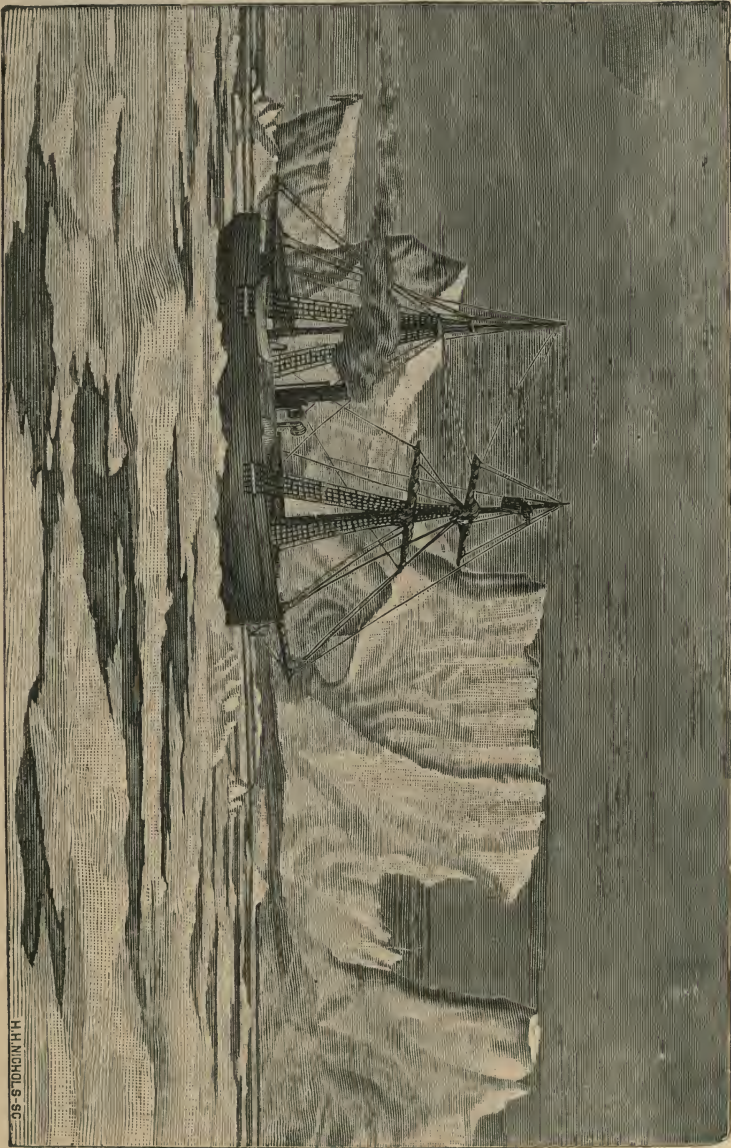
Mate Chester had given his opinion that they should save what advance had been already made in place of risking a drift to the south, or, perhaps, a fatal imprisonment in the ice. Tyson, who had spent much of his time in the Crow's Nest, advised Hall to seek a harbor as soon as possible, and if the ice should be driven out of the channel, then start again further north. Captain Budington had pointed out the bay which he wished the vessel to enter, and expressed himself strongly as regards the dangers and difficulties of an attempt to force a passage through the pack-ice to the west. The three officers urged that the ship had done what she could; that the west coast could not be reached; that the young ice of winter had already begun to form, and that there was great danger of losing everything unless immediately a safe anchorage should be secured.

Hall's decision to go to the west seemed during the remainder of the 31st to be fully justified by the propitious state of the weather and the indications of open water to the north. The atmosphere was very clear, distinctly showing both shores of Kennedy Channel, which appeared to extend far to the north, the western shore the further north before its turning to the west. And the most interesting sight was that of a dark-looking cloud skirting the horizon to the north and northeast, and extending almost entirely across the open space between the two coasts. Some of the ship's company thought that this was a water-cloud indicating the existence of an open polar sea; others were certain that at different points along the cloud they saw plain outlines of land; a few recognized in the darkest shade near the horizon a water-cloud, but in the lighter portions, only a fog-bank; and others again contended it was a fog-bank resting against a mountainous coast, and that where it occasionally opened they could distinctly see bold headlands.

But, whatever may have been the true character of these appearances, presented to the eyes of men whose excited and ardent feelings at such an hour must be appreciated by all, it was unfortunately their

irrepressible consciousness that there was no open water around the vessel; and from the mast-head none could be seen except occasional

WORKING THROUGH THE ICE.



pools. Although the "Polaris" improved every possible chance and opening, she made but twelve miles in four and three quarter hours;

only three of which were to the north. Her highest advance appears to be safely recorded at $82^{\circ} 16'$,* about two hundred miles north of Kane's highest, and fifty miles above that reached by Dr. Hayes.

In the first four days of September the "Polaris" drifted to the south, a distance of about forty-eight miles in a direct line. On the 1st, the ice driven by the wind pressed upon the ship so closely that every man was ordered to hold himself in readiness to leave at an instant's notice; fears were entertained that damage would be done to the propeller, the hoisting apparatus for which was placed in position; unsuccessful attempts were made to unship the rudder. At 7 P.M. a huge berg piled up masses of ice before the vessel and gathered the smaller pieces about it; the hawsers bent to the ice-anchors in the floe parted, and the ship heeled over. Twenty feet thickness was pressing upon her creaking timbers with ice piled up to the bulwarks; stores and provisions were placed on the deck, and preparations made for preserving life; but, two hours afterwards the ship

* It seems best to present here the language of Admiral Davis, on this interesting point of the history. On page 84 of the "Narrative of the North Polar Expedition," he says, "It is impossible to tell the precise latitude which the 'Polaris' had attained when at her highest northing. Eighteen hours before, her position had been accurately determined; from that point her place was carried forward by dead reckoning. Two separate log-books were kept, in which the courses and distances were correctly entered; two patent logs were used for the latter. Messrs. Bessels, Bryan, and Meyer, composing the scientific corps, had kept regular watch from the departure of the ship from Tessuissak up to the time when her progress was arrested. They also kept a journal, in which were entered the courses, and the distances (determined by one of the separate patent logs); and this was entirely independent of the ship's log-book kept by the mate. No better method could have been adopted for securing all the accuracy possible under the circumstances; yet the difficulties and interruptions in polar navigation are so unceasing and violent that it is impossible to speak of results like these as being anything more than approximations to the truth.

Again, on page 96, speaking of the ship's position after the renewed attempt to work northward he says: "This advance placed the ship in lat. $82^{\circ} 16' N.$; a result deduced from observations obtained independently of those which had given her position at 6 A.M. of August 30. The latter was determined by dead reckoning from noon of the preceding day; the former started from the latitude of the southern entrance of Repulse Harbor; determined by Mr. Meyer, by a meridian sub-polar observation on June 30 of the next year. This reckoning made up from this subsequent observation, takes into account the courses and distances only without allowance for current or drift. Where so many disturbing causes existed, the effect of which cannot now be estimated, the determination must be received as approximate only.

righted. On the 2d all hands were busy from 2 P.M. till midnight in transferring on sleds to the floe sufficient stores and coal to supply the

THE "POLARIS" IN THANK-GOD HARBOR, SEPT. 5, 1871.



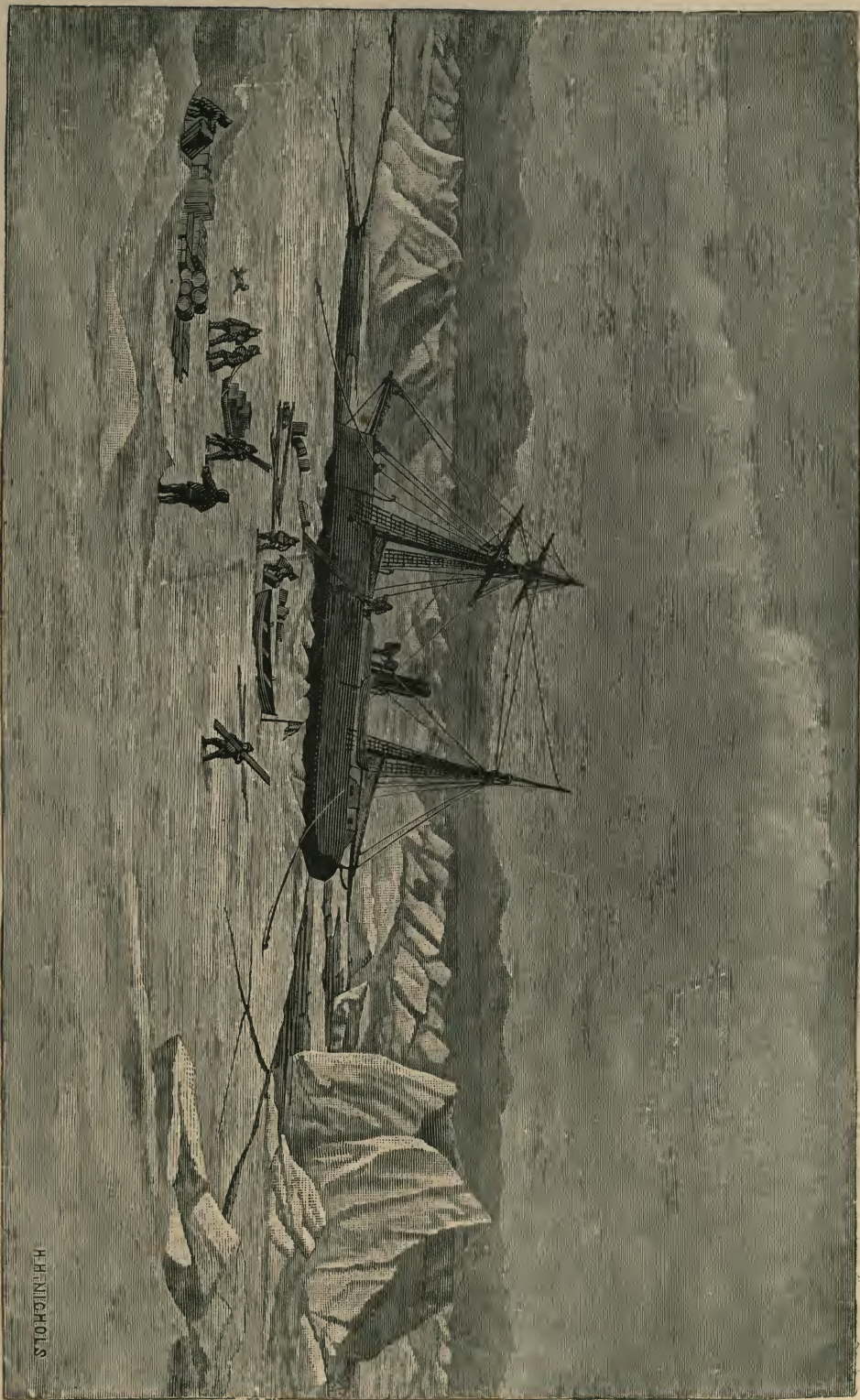
wants of the ship's company during the winter. On the 3d the wind shifted to the southeast bringing with it much snow, but also the ap-

pearance when this had cleared off, of indications that the ice would soon open and give another chance to secure a safe anchorage; on the 4th, the ice was cleared from the propeller well, the screw shipped, the stores again brought back from the floe, and the ship through a passage opened by the driving northeast wind freed herself from the ice. By midnight she was close in upon the eastern shore, and her anchor was dropped in ten fathoms of water. This was to be her position for many weary months.

THE HARBOR.

The harbor at last found was no snug anchorage, but was inside of the line of the main current and somewhat sheltered by a bold cape at a distance of about four miles north and west of the ship's place, — a cape named by Hall after one of his first benefactors in Cincinnati, Colonel James Lupton. A huge iceberg gave additional and lasting security. Its dimensions, measured by Hermann Siemens, were: length four hundred and fifty feet, breadth three hundred feet, and height above the water sixty feet; under the usual estimate for bergs, this height being counted as one third of the whole structure, its foundation of one hundred and twenty feet seemed promising of stability, and so proved even to the saving of the ship. Hall at once named it Providence Berg. He had now at least a strong security from being drifted further southward, and from being thus again imprisoned, or his ship crushed. Having submitted to the decision reached by a second consultation that any further northward advance was impossible, he promptly acknowledged the providential preservation which had been given and the successful advance secured, and encouraged his officers and crew with the hopes in which he felt himself justified in indulging that by sledge journeys to the north the great objects of the voyage could be entered upon. First of all he would secure as far as possible present safety and rest for officers and crew. A large quantity of stores and provisions were landed and their amount still further increased on the 6th, on which day a search for a better harbor was unsuccessful. For this landing two whaleboats with planks laid across were employed and the short

LANDING STORES ON THE ICE, SEPT. 2, 1871.



H. H. NICHOLS

trips to the shore rapidly made. When the sun came out bright, observations of the altitude gave the termination of the position to be $81^{\circ} 37'$.

The land as seen from the ship consisted of broken series of elevations and depressions with occasional spurs, the mountain ranges varying in direction from south to east, and in elevation from nine hundred to one thousand four hundred feet, several prominent peaks showing themselves in the furthest range. Their argillaceous schist had spread its débris over large surfaces, but to no depth; not the slightest trace of vegetation being found except a few lichens. The débris from Cape Lupton reached almost to the seashore, and over it boulders were scattered in every direction. In some few places near the fresh-water lakes and the water-courses, an alluvium had been formed which, enriched by the birds in great numbers, formed garden spots in the narrow plain between the seashore and the ice-foot. On this plain the flora of the brief Arctic summer appeared.

Among the remains of the summer tenting-places of Eskimos, plain indications were found that a large party had passed part of a summer there. The remains consisted as usual of the stones in circles, the seal-skin tents which these stones had kept in position having been taken down and carried away.

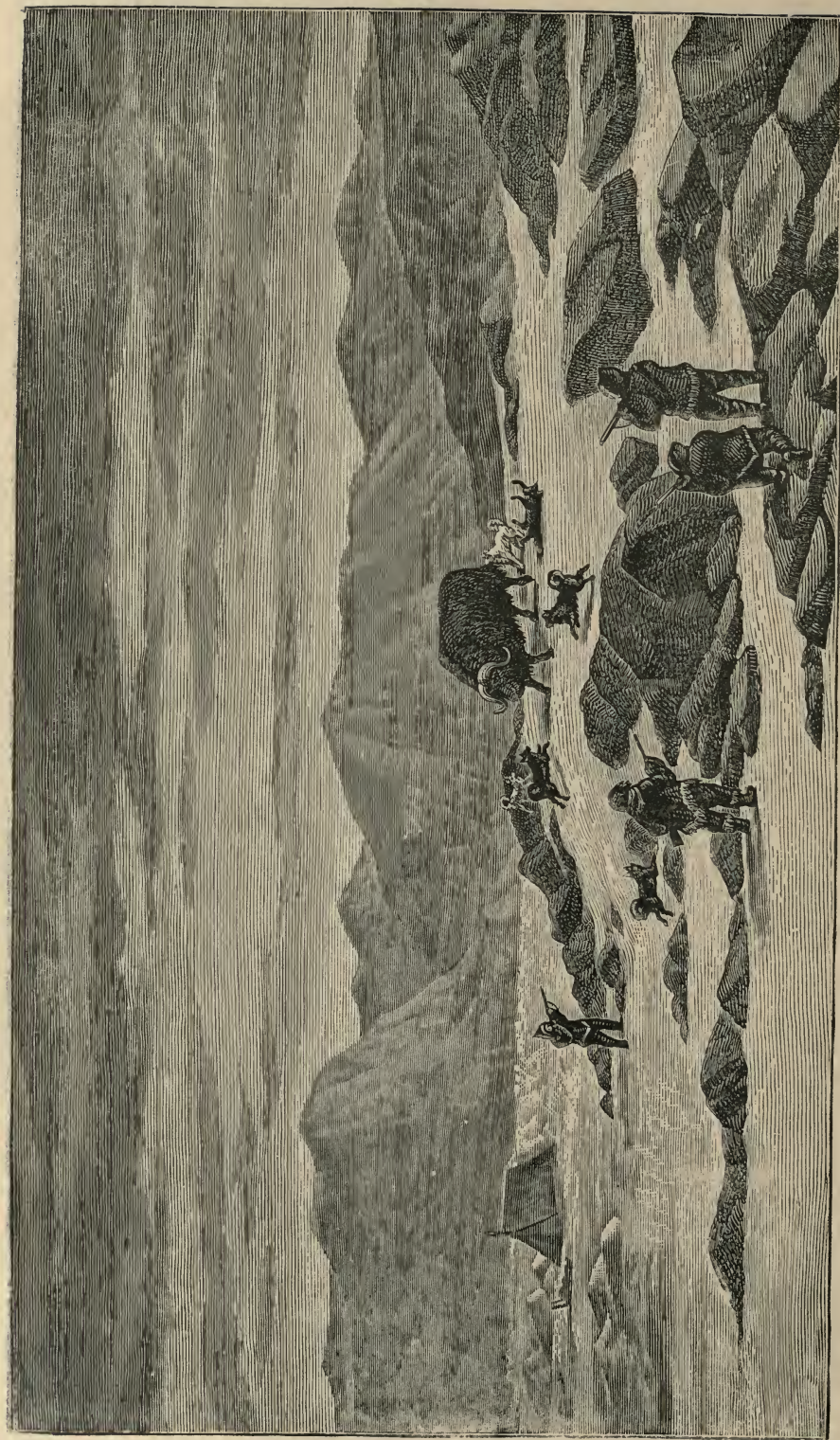
After this discovery of the traces of Eskimo life at this point, Hall and the members of the Scientific Corps set out for the summit of Cape Lupton to begin the survey of the surrounding coasts, and ascertain the state of the ice in Robeson's Strait; the party being provided with a small Casella theodolite, a pocket aneroid barometer, and a pocket prismatic compass. At the close of a fatiguing walk over the plain, covered in some places with deep snow, in others with massive boulders, they came to the deep ravine which separates the cape from a high and steep hill which had received the name of Observatory Bluff, and were here brought to a stand as to the readiest way of climbing the cape. The ravine seemed the easier of ascent, and the side of the cape facing the ship, very difficult. But the majority of the party, by passing up a narrow gorge filled with fresh snow, succeeded in reaching the summit, an elevation of more than one thousand three hundred feet, Hall being

the foremost. With the usual experience of Arctic travellers, they found their first elevation, when gained, to be not the end of their journey, but only the means of showing to them a second or third summit. From the true highest point at last climbed, the western coast was very distinctly seen as far as the Cape Union of Dr. Hayes, and beyond that cape, three other peaks. The sight of the eastern coast was cut off by a projecting cape. The channel as far as could be seen was filled with closely packed ice, with no water cloud.

Much snow now began to fall almost daily, and the ice rapidly increased in thickness; it was difficult to keep open the channel between the ship and the shore. An opening being made through the frozen slush the Observatory was taken over, section by section. Set up without the use of iron, it was available for magnetic observations.

From altitudes of the sun taken in the intervals between passing clouds, Hall deduced $61^{\circ} 44' W.$ as the longitude of his winter quarters. These were now improved by changes which provided for the berthing of the whole crew below deck, and for economy in fuel. To provide to the utmost for the comfort of the ship's company, he gave up his own state-room. On shore a house was built for the necessary entertainments of the long Arctic winter now early setting in, for the day was becoming sharply defined; twilight even was growing faint. The Eskimos, Hans and Joe, had begun their successful captures of the seal and of some of the little game which had not yet gone south; they had also seen traces of musk-oxen. In this last news Hall had promise of fresh meat, of the value of which as a defence against scurvy he was well aware. The weight of one of these animals, killed before the close of September, was nearly four hundred pounds. None had ever been met with by the previous Expeditions on the west coast of Greenland, although found in large numbers on the eastern coast, and on the mainland of the continents.

Mr. Bryan and Mr. Meyer were frequently engaged in surveys of the Bay and its surroundings; one of their excursions for this purpose involving much hardship. The two wore the ordinary native light foot-gear; but Mauch, who accompanied them, wore heavy cow-hide



SHOOTING THE FIRST MUSK-OX, WEST COAST OF GREENLAND.

boots, which encumbered his walk, and occasioned three dangerous falls through the ice fissures into the sea. Bryan and Meyer regained the ship after midnight in a state of complete exhaustion, and Mauch's life was saved only by a search made by Morton and Siemens, who found him almost unconscious.

SLEDGE JOURNEY PROPOSED.

At morning prayers, October 10, Capt. Hall announced his intention of starting that day upon a sledge trip, the object of which was to reconnoitre and select the best route for his spring journey toward the Pole. He had hoped to make this examination before the close of the previous month, and was delayed only by the snow being not deep enough for sled-travel over the plain, and by the preparations needed for the journey, and for the new dangers which threatened the ship. September 27, a severe gale from the southwest had driven the pack in, and formed large hummocks on her sides, and on the 28th, when his preparations had been made for leaving, the high tide in connection with a breeze from the same quarter, again piled up the ice in all manner of shapes. It became necessary to veer the cable, and it was found when the pressure ceased, that the berg had been forced in towards the shore one hundred yards, and the ship fifty yards. Had she not been specially fitted for arctic service by the strengthening given before leaving the United States, she must have been crushed. During the two days which followed, much snow fell, the wind shifted to the north, and an open channel was formed between the loose pack of the Strait and the floe at a distance from the vessel of about three-fourths of a mile. The ship being safe, and some necessary arrangements for the further preservation of the stores and the comfort of his men having been made, Hall was ready to start north. To the Sailing-master he gave specific instructions substantially as follows:—

First, for the conduct of the ship, if she should remain safe in her winter position, of which he "felt almost certain," that she should be banked up with snow-blocks cut from the drift under the lee of the neighboring hill, and have her housing put up; that the watch should be continued until the cook commenced his morning work; that the

most careful economy should be practised in the consumption of coal, no more being used than would keep the thermometer fore and aft at 50° with a very small fire only through the night, and candle-light only after 9 P.M., and that the remainder of the stores and provisions should be placed in complete order on the plain by the observatory.

But under the possible contingency of the "Polaris" being driven from her position, he wrote: "A full storm from the south can send the pack of the Strait upon the land-pack upon which we are, and in a few moments cast the 'Polaris' high and dry upon the land; or, a storm from the North might drive the ice out of Thank God Harbor and the 'Polaris' with it; the spring tides must, therefore, be watched with great vigilance, especially during any gale or storm. If the 'Polaris' should drift out, she must, if possible, be brought back to her former position; but should she be driven into the moving pack-ice of the Strait, and there become beset and unable to get released, then, unfortunately, the vessel and all on board would go to the southwest, drifting with the pack, — God only knowing where and when the ship's company would find means to escape. It might in this case be that such a drift movement would occur as in the case of the United States Grinnell Expedition of 1851-52, and of the 'Fox' under McClintock in 1857-58; but whenever the 'Polaris' should get released, if anywhere between Cape Alexander and Cape York, or between the latter and the Arctic Circle, she might then make her way to Godhavn, Disco Island, and, if she should remain seaworthy, be filled up with coal, stores, and provisions, and next fall (1872) *steam back to this place*. If the vessel should become a wreck or disabled from the imminent exposure and dangers of such an ice-drift as referred to, then all possible use of the best judgment must be brought into play for the preservation of the lives of all belonging to the Expedition."

"You will, at your earliest moment of escape, acquaint the Government of the United States with the whole of the circumstances; and should one of those circumstances be the loss of the 'Polaris,' I, and my small party that is about to accompany me on the proposed sledge journey, will remain here to make discoveries to the North Pole,

using Thank God Harbor as our headquarters, and all the time feel certain that our country would lose no time in sending us aid in carrying out the great object of the present Expedition."

Captain Hall had selected Mate Chester, Joe, and Hans to accompany him. At the start at 1 P.M. it required the half of some of the crew to assist the dogs to pull the heavily loaded sled, which made but five miles before the party went into their first igloo. Hans returned for a second sled and more dogs; Hall had set out with but twelve. Leaving the igloo on the 12th, he travelled over the plain to the northeast, keeping along the foot of the mountain range; he thought that this plain was once a river-bed. At 1.30 P.M. of the 13th he found an icy river, the course of which was in the direction of the journey, and travelled with ease over its smooth surface, encamping on it for the night. Fresh water was obtained by Hans by cutting through the ice. On a walk the next day along this river, and at a little distance inland, to see if much cattle were to be found, Hall was disappointed in this, which had been one of the chief expectations prompting this trip. Except a few lichens, he found here no signs of vegetation, nothing to tempt the animals; but he thought they might be met with on an extensive plain which showed itself at some distance.

On the 18th he walked to the top of a high cape, finding on the first elevation ascended a boulder twelve feet high, covered with lichens. Further on, different species of flowering plants and grasses were seen up to the mountain's top. From the summit, the land on the west side of the channel appeared to run to the north and east until it ended in a cape nearly due north, turning then abruptly to the west. The east coast ran to the northeast and disappeared on turning to the east at a distance of ten or twelve miles. Across the straits, far away to the north and east, a cloud was seen, but Hall could not determine whether it was a water-cloud or the loom of the land. After spending some time in surveying and examining the surrounding country, and making an unsuccessful endeavor to round the cape, he determined to return, and on the 21st began to retrace his steps. The day, like most all of the others during this sledge journey, was so foggy as to make it quite

impossible to take good sights; it would have rendered useless any time spent hunting musk cattle. On the 24th he sighted the masts of the "Polaris."

HALL'S LAST DISPATCH.

On the 20th he had deposited in a cairn, of which the cut is a literal transcript from the sketch in his notes, a dispatch to the Secretary of the Navy, which is presented below in full, as the last ever received from or prepared by the unfortunate explorer. Communicating it, he said:

"Chester at my suggestion took one of the boards of the twenty-eight pound wooden box, that I ordered to be taken apart last evening



THE CAIRN.

B, buried cylinder; C, condensed milk-canister, filled with sand; D, two pound meat-can; E, small water-trench; A, cairn. 10 F. E. This stone of slate placed at A in the ground, face up, close to the one above, which is vertical.

Fog and indistinct light.	}	Cape Brevoort (N. 50 E?)
		Sixth encampment distant 43 of my measures. (N. 15 E.)

(a couple of pounds of which we used last night in making scouse (lob-scouse or olio), and six quarts of extra water), and with his knife, cut in bold letters, '10 F. E.' (feet east), and this and thirteen other pieces of that box were scattered about the cairn. It was not without difficulty that we found stones of sufficient size and number with which to build this small pillar. Joe dug the hollow in which to deposit the copper cylinder. This cylinder was one of those specially designed for deposits, and was rendered air and water tight by being sealed with white bees-wax; at the bottom I placed a small piece of board, then on either side two other pieces; and, last, on the top, another; then we covered the same over with three inches of shingle of the plain."

The following is the dispatch : —

“SIXTH SNOW-HOUSE ENCAMPMENT, CAPE BREVOORT,
“North-side entrance to Newman's Bay, Oct. 20, 1871.

“*To the Honorable Secretary of the U. S. Navy, GEORGE M. ROBESON.*

“Myself and party, consisting of Mr. Chester, first-mate ; my Eskimo, Joe, and Greenland Eskimo, Hans, left the ship in winter quarters. Thank God Harbor, lat. $81^{\circ} 38'$ North, lon. $61^{\circ} 44'$ West at meridian of October 10th, on a journey by two sledges, drawn by fourteen dogs, to discover, if possible, a feasible route inland for my sledge journey next spring to reach the North Pole, purposing to adopt such a route, if found better than a route over the old floes and hummocks of the strait which I have denominated Robeson's Strait, after the honorable Secretary of the United States Navy.

“We arrived on the evening of October 17, having discovered a lake and a river on our way ; the latter, our route, a most serpentine one, which led us on to this bay fifteen minutes (miles) distant from here southward and eastward.

“From the top of an iceberg, near the mouth of said river, we could see that this bay, which I have named after Rev. Dr. Newman, extended to the high land eastward and southward of that position about fifteen miles, making the extent of Newman's Bay, from its headland or cape, full thirty miles.

“The south cape is high, bold, and a noble headland. I have named it Sumner Headland, after Hon. Charles Sumner, the orator and U. S. Senator ; and the north cape, Brevoort Cape, after J. Carson Brevoort, a strong friend to Arctic discoveries.

“On arriving here we found the mouth of Newman's Bay open water, having numerous seals in it, this open water making close both to Sumner Headland and Cape Brevoort, and the ice of Robeson's Strait on the move, thus debarring all possible chance of extending our journey on the ice up the Strait.

“The mountainous land (none other about here) will not admit of our journeying further north ; and as the time of our expected absence was understood to be for two weeks, we commence our return to

morrow morning. To-day we are storm-bound to this our sixth encampment.

"From Cape Brevoort we can see land extending on the west side of the Strait to the north 22° West, and distance about seventy miles, thus making land we discover as far as lat. $83^{\circ} 5'$ North.

"There is appearance of land farther north, and extending more easterly than what I have just noted, but a peculiar dark nimbus cloud hangs over what seems may be land, and prevents my making a full determination.

"August 30, the 'Polaris' made her greatest northing, lat. $82^{\circ} 29'$ North; but after several attempts to get her farther north, she became beset, when we were drifted down to about lat. $81^{\circ} 30'$. When an opening occurred, we steamed out of the pack and made harbor September 3, where the 'Polaris' is (corner of manuscript here burned off). Up to the time I and my party left the ship all have been well, and continue with high hopes of accomplishing our great mission.

"We find this a much warmer country than we expected. From Cape Alexander, the mountains on either side of the Kennedy Channel and Robeson's Strait, we found entirely bare of snow and ice, with the exception of a glacier that we saw covering, about lat. $80^{\circ} 30'$, east side the Strait, and extending in an east-northeast direction as far as can be seen from the mountains by Polaris Bay.

"We have found that the country abounds with life; seals, game, geese, ducks, musk-cattle, rabbits, wolves, foxes, bears, partridges, lemmings, etc. Our sealers have shot two seals in the open water while at this encampment. Our long Arctic night commenced October 13, having seen only the upper limb of the sun above the glacier at meridian October 12.

"This dispatch to the Secretary of the Navy I finished this moment, 8.23 P.M., having written it in ink in our snow hut, the thermometer outside — 7° . Yesterday, all day the thermometer — 20° to 23° .

"Copy of dispatch placed in pillar Brevoort Cape, October 21, 1871."*

* The original draft of this dispatch was brought to Washington by Eskimo Joe, who had carefully preserved it in Hall's writing-desk, which he had picked up on the ice after

At 9.40 A.M. he completed the cairn and deposited the document. The monument, two feet high and two and one half feet at its base, is on the brow of the second plain from the sea, about fifty feet above its level.

DEATH OF CAPTAIN HALL.

Returning from the sledge journey, Captain Hall stopped a few moments to converse with Dr. Bessels at the Observatory, and then went immediately on board the "Polaris," shaking hands with those whom he met, and speaking very encouragingly of the prospects of the expedition; adding that he expected in a couple of days to start upon another sledge journey. On drinking a cup of coffee brought to him by the steward he was immediately taken with violent vomiting and retching and went to bed. Dr. Bessels, on examination, expressed great fears that the sickness might be fatal; at 8 P.M. he announced that Captain Hall's left side was paralyzed and that he had had an apoplectic attack. In the morning of the 25th he was much better; in the evening he suffered again much pain from constant efforts to vomit. On the 26th Dr. Bessels administered quinine, and cold compresses; on the 27th and 28th Hall was again much worse, and on this day and the two following showed marked evidences of delirium. From this he seemed to recover and to regain some strength, employing his time in getting in order the records of his late sledge journey and dictating for several hours to his clerk, Mr. Mauch. But on the night of the sixth he had another attack, from which he sank into a comatose state until 3.25 A.M. of the 8th, when he expired.

He had a good constitution and had been rarely sick, but had experienced several very severe attacks during his Second Expedition, on his return to Cincinnati at its close, and while preparing to sail in the "Polaris." Two attacks had been those of vertigo. The severe strain of mind to which he subjected himself, coupled with the dis-

the separation of the floe party from the "Polaris," October 15, 1872. A photo-lithograph will be found in the second edition of the "Polaris" volume, issued after the death of the late Admiral Davis.

The dispatch deposited in the cairn was found by Dr. Coppinger of the English Arctic Expedition, May 15, 1875, and sent with other relics by the British Admiralty to the United States Government.

appointment experienced by his being able to make no further northing, and the consciousness that no one of the heterogeneous party on board the "Polaris" had sufficient sympathy with his objects to relieve him from the greatest responsibilities, were in all probability the immediate occasion of the fatal result.

At the close of an extended inquiry, made Dec. 26, 1873, by the request of the Secretary of the Navy, Surgeon-General Barnes, U. S. A., and Surgeon-General Beale, U. S. N., after the return of the ship's company, Dec. 26, 1873, certified that, after listening to the testimony of Dr. Bessels with great care, and putting to him such questions as were deemed necessary, from the circumstances and symptoms detailed by him and compared with the medical testimony of all the witnesses, they were conclusively of the opinion that Captain Hall died from natural causes, — viz., apoplexy, and that the treatment of the case was the best practicable under the circumstances. [Report of Sec'y Navy for 1873.]

The body of Captain Hall, after being prepared for burial, was covered with the national flag.

A party under Mate Chester sent on shore to dig the grave succeeded after the fatiguing efforts of two days in excavating the frozen ground to a depth of twenty-six inches—the seat of permanent frost. "It was daytime, but all darkness there at that season," the digging being done by the light of lanterns. At 11 A.M. of November 10, the ship's bell was tolled, the coffin placed on a sled, and the burial procession, headed by Assistant Navigator Tyson, picked their way again by lantern light over the ice to the grave on shore. The ground was mostly covered with snow. At the close of the burial service read by Mr. Bryan "the silence which followed was broken by the sounds of the earth on the coffin and the sobs of Hannah." An overwhelming calamity had fallen on the sorrowing company. As regards the object of the expedition also, it was a fatal issue.

WINTER ON BOARD THE "POLARIS," 1871-72.

On the death of Captain Hall, the command of the expedition devolved on Captain Budington, who promptly signed with the chief of the Scientific Corps a paper which closes with the words: "It is our

FUNERAL OF CAPTAIN HALL, NOV. 10, 1871.



honest intention to honor our dear flag, and to hoist her on the most northern part of the earth; to complete the enterprise upon which the eyes of the whole civilized world are raised, and to do all in our power to reach our proposed goal.

“S. O. BUDINGTON.

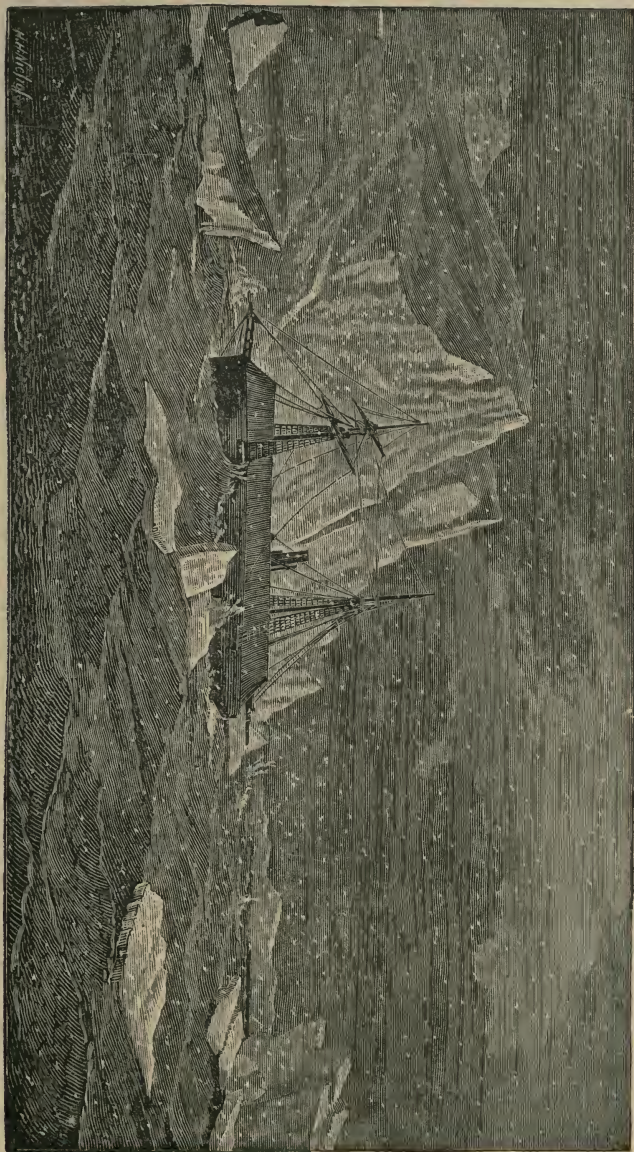
“EMIL BESSELS.”

The severity of the long Arctic winter showed its beginnings before the middle of November. On the 18th and the two following days, a gale from the northeast blew with the violence of nearly fifty miles an hour. Hermann Siemens, a very strong man, while making his usual tidal observations was literally taken up by the storm and thrown upon the ice, and the ship itself was driven over on one side, her snow wall being shoved out and broken. Dr. Bessels and Mr. Meyer were rescued by Hans and Joe from the greatest danger on their return from observatory duty. The Eskimos knew better how to battle with the strong wind. At the Observatory, the Anemometer's caps were whirling round at amazing speed, indicating while it was possible to stand long enough before the wind to read, a velocity of from fifty to sixty miles. The creaking of the masts and the howling of the wind, together with the darkness, increased by a heavy drift of snow, made the day one of anxiety; the cracking of the ice around the vessel was felt, and it was soon discovered that she was afloat with eight fathoms of water forward and six aft, increasing to twelve and a half. She was brought up by the best bower, the starboard anchor; and, by Niederman and the Eskimos performing the dangerous duty of replanting ice-anchors, was again secured to Providence Berg. She drifted against the northeastern side, and her stern was exposed to the attack of the floes, but by a narrow chance she had been saved from being carried out into the channel to drift south.

Five days afterward, a gale from the southwest broke the berg itself into two parts, and the ice forced in between them, separating them by a distance of eight feet; at midnight the two parts were found to be in motion, the smaller one moving more rapidly. The strongest man now held his breath, for it really seemed that the ship must be

crushed, and it was thought several times that the ice had been forced through her side; but when she came in contact with the berg a large

"POLARIS" ADRIET, NOV. 21, 1871.



tongue of ice below with the help of the wind raised her bow with a cant. "This probably saved her." Siemens says: "Had the ice on

the lee side of the berg been as strong as that on the weather side, the ship would surely have been cut through or thrown on her beam-ends."

On the 29th the berg moved in towards shore, shoving the "Polaris" before it, and at three in the morning, firmly grounded; and new dangers appeared when the tide fell, for the stern of the vessel sank, leaving the bow four feet higher; she also heeled over to port so much that it was impossible to walk the deck; but when the tide rose, the ship came to an even keel. The frightened Eskimos built two snow-houses on shore to live in. But the "Polaris," although much strained, was again saved, and the ship's company celebrated the 30th as Thanksgiving Day; the snow-houses built on shore were never occupied.

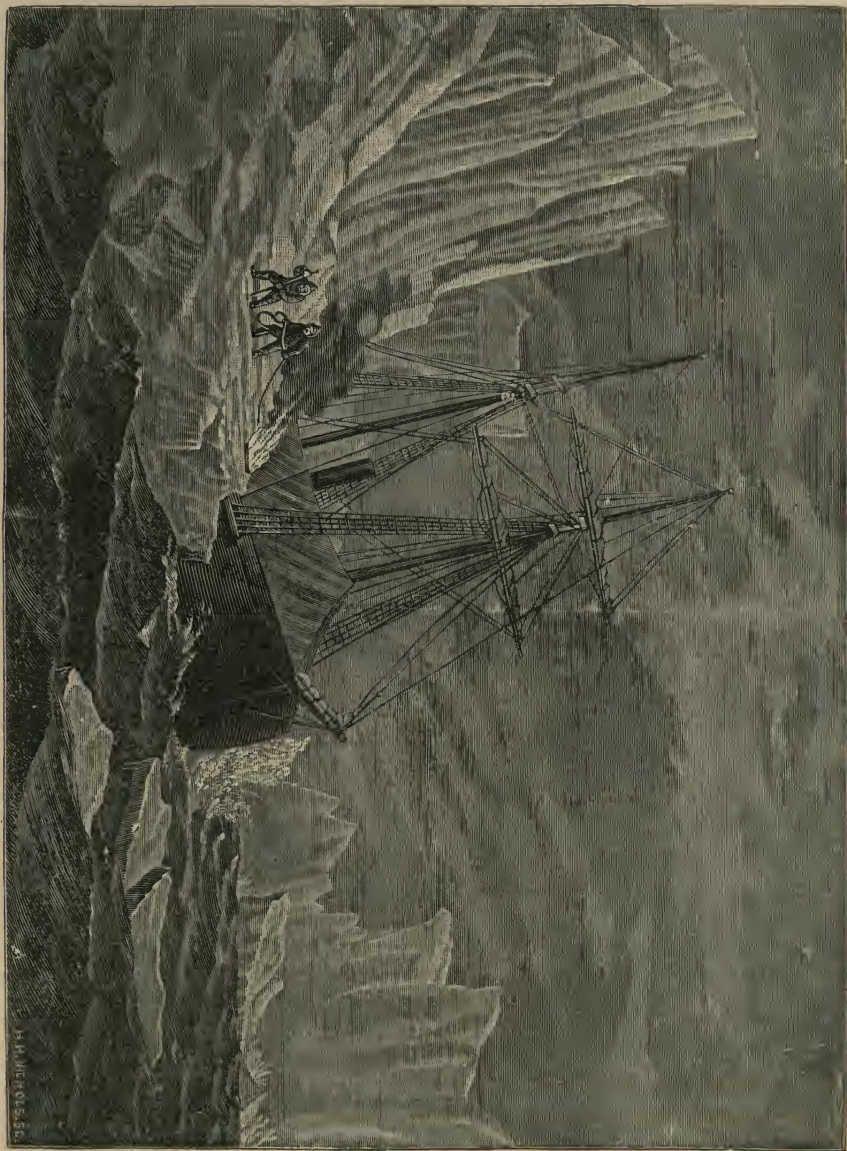
Life on board the "Polaris" during the month of December, 1871, was comparatively monotonous. It was found impossible to change the position of the ship which had been made so uncomfortable by the piling up of the ice about the stern; at low tide the list, especially on the starboard side, was exceedingly disagreeable.

The ice in the straits was so loose that the least atmospheric disturbance set large masses of it in motion. On the 10th, open water was observed two or three miles distant; this was the period of "springs."

In the middle of the month, the "Polaris" labored greatly, the creaking of her timbers as she moved up and down against the berg sounded like volleys of musketry, and the berg itself which was continually breaking in pieces, pressed more toward the ship. Hummocks were piled up to the height of thirty feet above the sea level, and the effect of the constant pressure was to raise the vessel still higher, making her condition more unsafe and uncomfortable. The snow wall by which she had been surrounded having been carried away when she broke adrift, the berths were now much colder. The thermometers on board no longer agreed with those of the observatory.

On the 25th, among the notes of his journal, Captain Budington says: "We are in by no means a safe position. The danger that threatens us is from the seaside, and this in the form of southwest gale, in connection with spring tides which may push the vessel further in shore. She will then have only two chances, either to resist the pressure of the berg and break the land ice, already three feet thick, or be

entirely lifted up out of the water." Two days afterward an attempt was made to free the vessel by exploding four large charges of gun



THE FASTENING OF THE "POLARIS" TO PROVIDENCE BEING, NOV. 21, 1871.

powder in different places not far from the ship's side. But this did not even crack the ice. The Captain expresses his regret that the ship

had not been anchored in Newman's Bay, where, he believed, her position would have been undisturbed in winter quarters, twenty miles further north.

The amount of coal consumed during the month was 8,060 lbs., an increase on the consumption of November, and this, notwithstanding the utmost economy exercised. Budington said :—

“If the consumption of this fuel is continued at the same rate, a stoppage of which, without endangering our health, is not possible, we will hardly have enough for two winters, to say nothing of using steam on our return. The idea of piloting the vessel through Smith Sound with the aid of sails is an absurdity. Without considering the safety of the vessel, the experiences of both Kane and Hayes are sufficient to show that a sailing vessel, and especially one like ours, can do absolutely nothing. The first opportunity, however, we get to leave this winter harbor will be taken, and with the aid of steam or sails, as conditions permit us, we will attempt to reach a higher latitude, so as to enable us to carry out the objects we are sent for.” The further provision then made for reducing the consumption of coal saved a thousand pounds during each of the months following.

January 16, 1872, twilight was visible at 8 A.M., and the ship's company began to look forward to the time when active spring work might begin. As the sunlight increased, it was seen that long confinement had brought a peculiar pallor to the face, but this a few days of continuous light might restore. No case of sickness had occurred; not the slightest form of scurvy. Judicious discipline had saved the strength and health of the company, who had been kept warm and comfortable, fed upon carefully prepared stores, supplied daily with lime-juice, and preserved from despondency by full recreation and voluntary exercise. The carpenter was occupied in building sledges for transporting the boats on a northern journey as soon as the season opened. One of these was fourteen feet long and two and a half feet between the centres of the runners, which were ten and a half inches high and had fourteen cross-bars fastened to them by lashes of raw-hide, which thus gave them a play of about six degrees—a great advantage in carrying a heavy load over rough ice.

Several visits were made to Cape Lupton and the points in its vicinity, to learn the state of the ice. On the 17th, Tyson and Joe were at the cape at meridian, when the twilight was brightest. No water was to be seen, the straits being covered with young ice, not strong enough to bear their weight, mixed with large floes of a recent drift; toward the western coast of the channel was a low cloud of fresh smoke. On the 19th, Kruger and Jamka, two of the crew, reached a second cape with a team of eight dogs. From a height here of about one hundred feet above the sea-level a large amount of open water appeared extending northward as far as could be seen, to a distance estimated under the bright moon to be twenty miles. The hummocks and bergs had disappeared and a new field of ice covered the waters. On the 24th Dr. Bessels, with two of the seamen, went to a third cape to examine this reported open water, and on the 28th Mate Chester again inspected it, finding a current of a mile an hour toward the north. The existence of this open water was regarded as favorable to boat journeys in the spring. These were the subject of frequent discussions during the remainder of this month and of February.

Dr. Bessels submitted to Captain Budington a plan of operations for the spring journey, in which he discussed the two ways of accomplishing the object of the Expedition; either by boats and the vessel herself or by sledges as at first proposed. The setting out of a boat party, he said, which might start the last of March or the beginning of April, would depend entirely upon the area of open water and its probable continuance. One of the smaller boats should be taken with as many provisions, instruments, and small stores as would be necessary, and the boat party should follow up the eastern side of the strait, surveying the land and making investigations in regard to the currents and deep-sea soundings, the last of these being of the highest importance; for, except those made by Ross in 1818, there were but a few others, — some taken by Inglefield and two by Kane.

For the best additional results to be secured he recommended that, during the time which must elapse before a northern journey could be begun, sledge parties should be formed to penetrate into the interior of the country, learn its configuration, determine astronomically the longi-

tude of Morton's furthest point, and re-survey the coast-line of Grinnell land, determining, if possible, how far it extends from east to west.

As the sledge parties would be compelled to travel over a poor country and make large distances, the difficulty of providing dog teams suggested the probable necessity of depending almost exclusively upon men for dragging them. All the parties would build cairns, deposit records; and whenever practicable signalize by flags and smoke, the "Polaris" firing a gun several times a day.

February 4, the twilight was now so bright that any kind of print, from fine diamond up, could be easily read. A spectrum was for the first time observed. Stars of the first magnitude could be clearly seen.

Mauch thus records an observation of a meteor: "At 4.30 P.M. when making my observation, and just attempting to read the anemometer, I observed in the east, above the range of hills, a bright meteor, slowly moving in a southerly direction toward the ground, at an angle of 45° . Its height when I first saw it was the same as that of Procyon. It was of a light-bluish color, resembling closely in its whole appearance, the blue light that falls from some kinds of rocket, when they burst in the air. Before it disappeared behind the hills, it left a few sparks behind, which, however, were soon extinguished. Its size was that of one of the stars of the first magnitude."

A very fine auroral display was witnessed in the evening, the movements of which were complicated and the spectacle very impressive. The sky showed at first a slaty appearance to the northwest, with occasional luminous streamers. At 7.15 that quarter of the heavens was of a blood-red color, while faint white streamers sprang up in rapid succession, increasing in numbers from the west, north, and northeast; all of them directed to the zenith, and the outward ones bending inward. The structure was that of a dome. Then they all vanished, giving place to others which rose from a wider extent of the horizon. At 8.30 new and very bright streamers toward the zenith gathered about it till they formed a corona. Next, all moved northward with a motion of between six and seven seconds to a degree. The corona opened, forming a beautiful curtain of an intense color between yellow and white; and at 9.30 another corona formed itself of new streamers

coming up in every direction. The display lasted all the night of the 4th, and continued with slight interruption through the 5th. The red color of the sky moved around and was last seen in the east, disappearing in the southeast.

The temperature during the first half of December had ranged high, the lowest being 24° ; during the last half the mercury was at 33° ; January 9, the thermometer read -48° . During February, the highest recorded was -07 , the lowest $-43^{\circ} 5'$.

On the 29th, Captain Budington acknowledged the receipt of Dr. Bessels' plan of work, and advised him that the expedition to the north would probably proceed by the aid of boats, in which case it was his intention to take the command; but that it appeared to be useless to come, as yet, to any conclusion as to this journey or the proceedings of the ship.

During the winter months scientific observations were diligently kept up; tidal observations, as well as the meteorological, were recommenced soon after the storm of November 21. Moon culminations were made by Mr. Bryan with the transit instrument, and experiments with the pendulum were begun January 2. Dr. Bessels gives the following account of his

"PENDULUM EXPERIMENT."

"The pendulum is an invariable, reversible brass pendulum, of five feet 7.75 inches in length, and very near synchronous, but not convertible. It is swung on steel knife-edges, and suspended in a box of strong board with a glass door. In order to disconnect the instrument as far as possible from the small building in which it was swung, a square hole was cut through the floor in the middle of the western wall of the observatory. Underneath this opening a heavy piece of timber was frozen solid to the ground. As the floor of the hut did not rest directly on the soil, but was placed on beams of oak, the plank mentioned before was entirely isolated from the observatory and became as firm, under the influence of the low temperature, after the course of a few days as the frozen soil itself upon which it rested. On this piece of timber the pendulum-box was screwed in such a manner that the plane

in which the pendulum was swung was that of the meridian, and in order to secure the utmost steadiness a barrel was placed outside the observatory on the same plank on which the pendulum-box rested. The barrel was surrounded by a heap of gravel, which was moistened with water in order to cement it in a solid manner to the plank. After this was done a hole was cut through the wall of the observatory behind the place where the pendulum-box was fastened. A half-inch iron bar, bent at right angles, was passed through this hole, and one end of it was fastened to the back wall of the box by means of five screws. The other end, which was about three feet over the centre of the barrel outside of the observatory, was screwed to a three-inch iron bar set up nearly perpendicular in the keg.

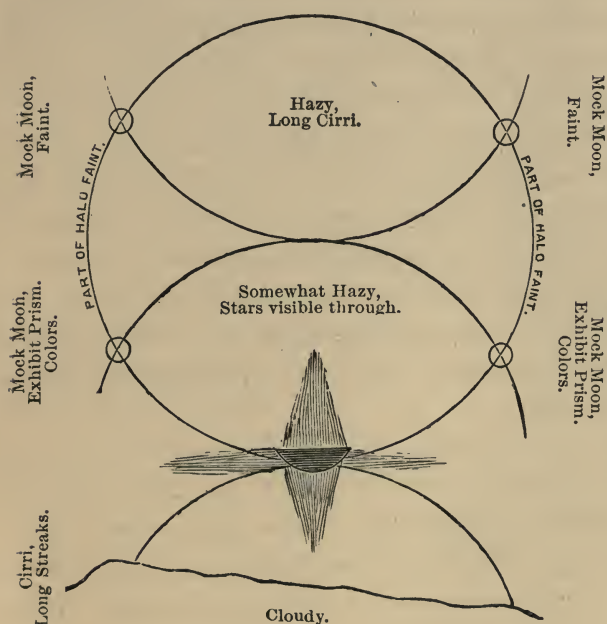
"After having accomplished the work so far, the barrel was filled with gravel and sand, over which was poured some water. Before the mass was frozen hard we levelled the pendulum-box as nearly as could be done, and when it was found to be tolerably level, the bar outside was fastened by means of ropes to the wall of the observatory, in order to prevent it from giving way and disturbing the position of the box. After two days had elapsed, the gravel was frozen solid and the ropes were removed. It was found that the box had not changed its level; but at the same time, it was not so steady as might have been expected. To secure it better, a hole of three inches' diameter was drilled through the floor of the observatory about one foot north of the box, and another one of the same diameter and at the same distance south of it. Through each of these holes an iron bar, one inch thick and three feet long, was driven into the frozen soil and connected with the box by means of two other iron bars bent at right angles, similar to the one mentioned above, and screwed together in a similar manner.

"The vibrations (performed in the plane of the meridian) were observed with a small direct-vision telescope placed about eight feet east of the arc of the pendulum. The point of the swinging knife-edge served as a mark, and observations were made with vibrations from right to left (north to south) and from left to right to correct for eccentricity of mark. Each set was begun with the right. An arc of a circle of 39.25 inches' radius, divided from the middle each way to five

degrees, with subdivisions of tenths degrees, was placed over the swinging knife-edge, and the extreme excursions to the right and left noted. The times were recorded by a sidereal chronometer, which was compared with five other box chronometers by means of a pocket chronometer before and after each set of observations was taken. The pendulum was swung in four different positions designated by the number stamped on the rod near the knife-edge; the numbers one and two being on one side, and three and four on the reverse. The steel plates

upon which the knife-edge rested were levelled by a small spirit level every time before the set was begun, when the door of the box was closed and kept shut till the set was finished."

Auroral displays had been of frequent occurrence through the season. December 29, luminous streamers were seen extending in an arch through the zenith from northeast to



southwest. January 6, beautiful displays were seen nearly all day. When the sky was clear and the breeze light from the south, luminous clouds extended themselves from the southwest in the form of an arch. Fantastic forms of light came and went rapidly, and there were bands of yellow and white. Again on the 10th, narrow bright strips ran up into an arc which passed from the western horizon through the zenith to the east, parallel with the milky way, and distant from it about twelve degrees; at the same time luminous streamers of a greenish hue shot up from the east. Like appearances

presented themselves on the 12th, 14th, and 16th. At these displays the magnetometer was not observed by Mr. Bryan to show any marked deflection.

On the morning of February 21, some very beautiful paraselenæ were observed; the thermometer was 30° below zero. Mauch made the sketch shown on the preceding page.

RETURN OF THE SUN.

On the 28th of February one of the happiest days was experienced. The sun would be seen after an absence of one hundred and thirty-two days, and at an early hour all hands were on the lookout, some perched on the foretop of the "Polaris," others on the top of Providence Berg. At 11.55 a small portion of the upper limb was seen for a few moments through a gorge in the mountain, and at 12.15 the whole orb suddenly appeared from behind Cape Tyson and rolled in full glory over the southern fiord. Cheer after cheer went up from the company, the men leaping and jumping about with cries of "Oh! how warm it is, he has not forgotten us." He continued above the horizon till 2 P.M. A bottle of wine was given to each of the crew, and cigarettes distributed among the men forward.

April 1, the captain of the "Polaris" organized two boats' crews to begin the exploration as soon as the state of the ice would permit: Mate Chester and Assistant Navigator Tyson were placed respectively in command, Dr. Bessels and Mr. Meyer being each second with four seamen. Orders were given that the boats and crews be ready to start the following month, and in accordance with the suggestions which have been named. Sledge journeys were in the mean time made to different points. Of one of these Mauch remarks: "I have been up to Cape Lupton, comparing Hayes' 'Open Polar Sea' of the 19th of May, 1861, with the present one. The straits present a vast volume of impenetrable pack with not a speck of open water." The temperature was still too low for the boat journeys. This state of the ice continued with little intermission until the 7th of June, when on a favorable report from Cape Lupton Chester's crew was sent thither, Tyson's also going forward on the next day. But, on the 11th, Mate Chester was

compelled to report at the ship, that, after passing a strip of open water leading around the Cape, his boat was crushed by the moving



THE "POLARIS" ROUNDING PROVIDENCE BERG, JULY 3, 1872.

pack, and with it the box chronometer, and the much valued Casella theodolite and other instruments. A renewed attempt met with not

much greater success,—both this crew and Tyson's succeeding only in reaching the mouth of Newman's Bay and there encamping.

The condition of the "Polaris" had become more unsafe and uncomfortable. A serious leak had been discovered as far back as May 24, and before the close of June it was necessary to keep the pump going twelve hours out of the twenty-four. By this date, however, there seemed a fair expectation that ere long she could be partially sawed out and clear herself by the opening of the ice. The northeast gale completely cleared the straits to the west and southwest, but died away without displacing the berg. After two days' laborious use of the ice-saws the stern of the vessel was freed; she slid from the tongue of the berg into an open cut and was once more afloat. There was much open water in sight. It was possible that Robeson's Strait was free and it was expedient to join the boat parties supposed to be as far north as Cape Joseph Henry. The "Polaris" rounded Cape Lupton and seemed to have a clear sea before her, but found an impenetrable pack near both Cape Sumner and Cape Lieber; she returned to Thank God Harbor, and again tied up to the berg. On receiving a message from Mate Chester that both boats were encamped at Newman's Bay, the Captain again started north to pick the boats up, the crews of which were needed to take care of the ship and make her ready to move north if the opportunity should offer. But this effort, as well as a third made during the first week of July, was again totally unsuccessful. Each crew was compelled to abandon its boat, and walk back from camp to the ship.

August 1, it had now become a matter of serious moment to attain any well-grounded expectation of accomplishing at this late date anything more towards the object of the expedition; or indeed, to provide for the safety of the vessel. The first of these objects, as will be readily seen from the preceding statements, seemed hopeless; the second was fast becoming the central object of all thought. The engineers reported that there remained coal enough for only six days' steaming,—a supply sufficient to carry the vessel under favorable circumstances to Disco. The Captain's journal says: "I have been living in hopes that we should get further north, but the season is so

unfavorable, the ice so compact and close, that if we had an opportunity to start north it would not be at all advisable, without a supply of coal,



BOAT CAMP, NEWMAN'S BAY, JUNE AND JULY, 1872.

to risk it with a vessel like ours at this advanced state of the season. We must leave the harbor, for delay now will most probably prove

fatal; we could not keep the vessel afloat in her present condition during another winter, and will be compelled to run her on the beach." On the 11th the ice in the straits was observed to be drifting south; at 4.30 on the day following the engines were started and the ship left Thank God Harbor.

With great care she was piloted between heavy floes, laboring heavily all night and at 5 A.M. of the 13th, was passing so swiftly through the open water which had been seen from Observatory Bluff, that it was necessary to shorten sail on account of the thick fog. Entering an impenetrable pack, she was tied to a floe, and drifted some



HOUSE ON THE FLOE.

hours slowly down the channel, making, as the ice here and there opened, very short advances as far south as $80^{\circ} 01'$, and having coal enough for four days' steaming only. Leaking yet more badly, she suffered several very severe nips. By the 27th every preparation had been made to abandon her.

The drift during the month of September continued chiefly toward the south and west, averaging not much more than a mile a day, checked at times by the southerly winds; on the third of the month she was in lat. $79^{\circ} 34' N.$, on the 30th only in $79^{\circ} 02'$. Nine hundred pounds of coal were used daily in working the pumps, and many plans tried for stopping the leak; all without success. As it was evident

that the party, if saved, must escape to the shore, a house for the floe was built, of the dimensions twenty-seven feet by twenty-four; the

BEFORE THE SEPARATION.



severe experiences of the month following making, however, new plans necessary. October 12, Cairn Point was only two miles to the south-

east; on the 13th Gale Point was due west at noon, and on the 14th Northumberland Island was in sight, the ship drifting still more rapidly under a northeast gale.

THE SEPARATION.

October 15 at 7.30 P.M., the "Polaris" ran among icebergs which broke up the floe to which she was attached, and the pack closing up, jammed her heavily. She was raised up bodily and thrown over on her port side, her timbers cracked with a loud report, and her sides seemed to be breaking in; a piece of ice being reported as actually driven through. Amid the violence of the storm, the darkness of the night, and the grinding of the ice, provisions and stores were ordered to be thrown out on the floe. This work was done with extraordinary rapidity and development of strength, under the intense excitement of the hour. The records of the Expedition work were placed far back upon the floe, with a large amount of provisions and clothing, and the two boats which remained were also lowered, and with the scow placed upon it.

At 9.30 by some change in the ice the starboard side of the ship was again clear, the vessel was free from pressure, and the cracks in the floe began to open, but unfortunately two of these cracks ran through the places where the stern anchors had been planted, breaking their hold, and the anchors dragging under the strain, she swung round to the forward hawser. It slipped. The "Polaris" was rapidly carried away from the floe and those upon it. The night was black and stormy, and in a few moments nothing of the floe or of the men on it could be seen through the drifting snow. Some dark forms were seen apparently rushing hopelessly toward the ship; the voice of the steward was heard calling out, "Good-bye, 'Polaris'!"

THE TWO PARTIES.

As soon as the floe disappeared, a muster on board the "Polaris" was answered by fourteen of the company, viz.: the captain, the two mates, the chief of the scientific corps, and the astronomer, the two engineers, carpenter, two firemen, and four seamen. On the floe had

been left nineteen, viz.: Captain Tyson, Mr. Meyer the meteorologist, the steward, the cook, six seamen, and the Eskimos, Joe and Hans, with

THE SEPARATION, OCT. 5, 1872.



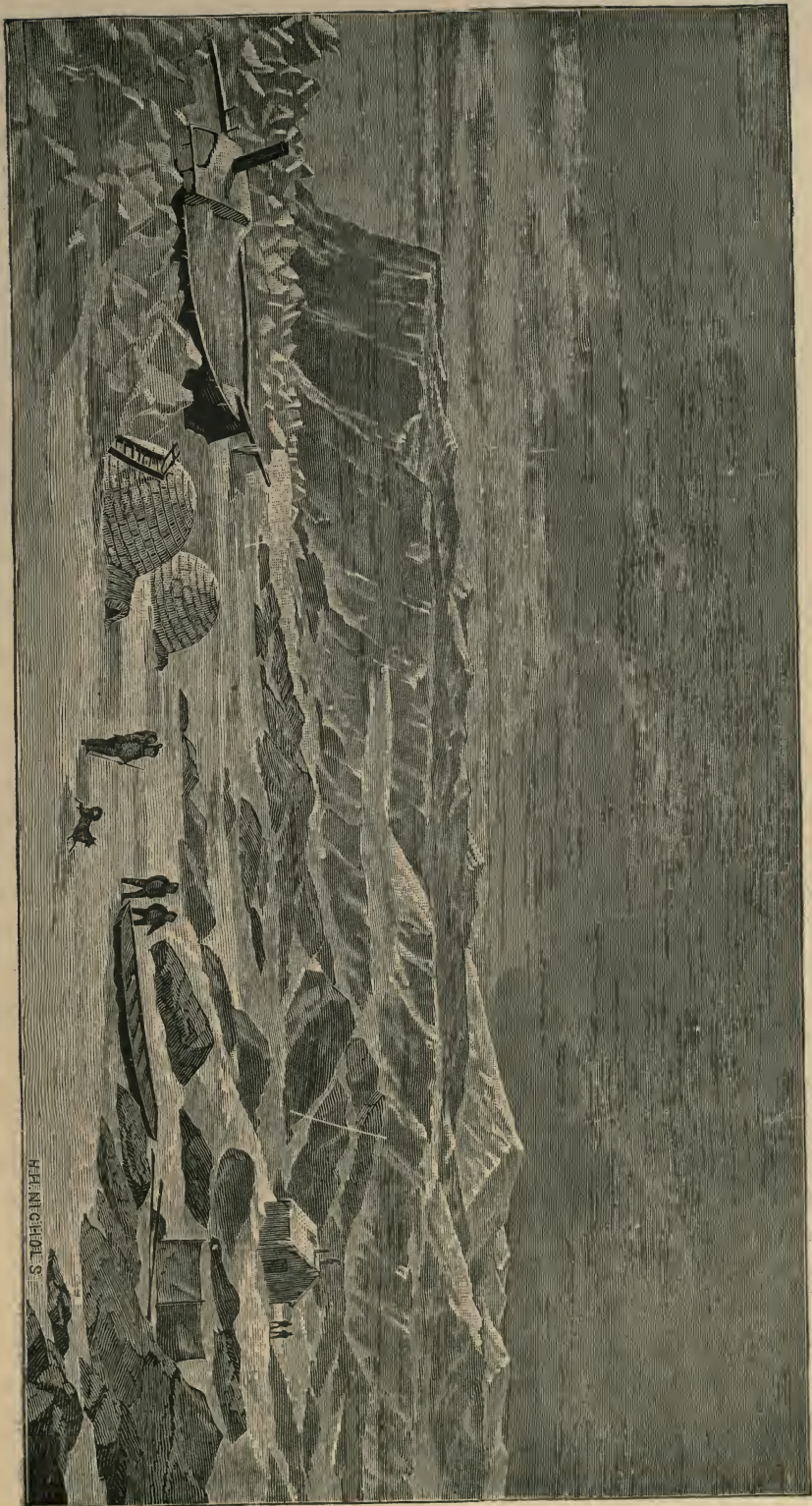
their wives and children, including a baby born to Hans August 12, and then christened Charles Polaris.

The first call upon the ship's company at this time of deep gloom and helplessness, was to be on the most careful lookout for the course of the ship, driven as she was rapidly through the rough sea, past the lines of bergs; and to keep if possible afloat. The remembrance that the boats had been left on the floe could not lessen the anxiety, and the engineers' report of the increasing leakage was alarming in the extreme. The water was pouring in so rapidly that they feared the fires would be put out before steam could be raised to work the pump. If the water rose to the fire-plates all must be lost, and at this moment it was lapping over the floor of the fire-room. Happily a few pails of hot water from the boiler started the four large main-deck pumps, to which all hands were instantly called, and by throwing into the fire every combustible material, including seal-blubber, the engineers, after more than an hour of the severest labor, got the steam pump at work. It rapidly gained on the leak, the wind died away, the moon showed herself more frequently, a few stars were seen, and worn-out men gave themselves up to broken slumbers. But where were the men on the floe?

Those on board waked on the morning of the 16th to a calm and clear day. Mr. Chester, from the Crow's Nest, and Henry Hobby, one of the seamen, with a good glass examined everything, but could see no living creature. They thought they saw some of the provisions and stores on the floe four miles distant; but others felt sure that this was black ice or stone or *débris*. Not one of their comrades could be seen.

The "Polaris," herself it was thought, must be abandoned; she had coal enough for a few days only, when a breeze from the northeast, breaking up the ice, and making lanes of water toward the shore, brought the ship to land. Her stern-post took the ground, and she was secured by heavy hawsers to large grounded hummocks, her starboard side toward the beach. Every preparation was now to be made for the saving of life on shore until either some providential rescue should appear, or the ship's company could build new boats and escape to the south; the latter of these two chances it will be found became the necessity. The position of the ship was not far from Littleton Island.

The ship's company were not under anxiety for the means of sustaining life, although their stores of clothing were very scanty, and they



POLARIS HOUSE, NEAR LIFE-BOAT CAVE, SPRING OF 1872.

H. H. NICHOLS

could hope to be without severe discomfort in the house which had been promptly built on shore from the material of the ship. During the remainder of the month, and through the winter, and the first months of spring, they were assisted by parties of the Eskimos from Etah and other points, but, at times, had the usual experience of finding the natives a great discomfort, by their frequent visitations and dependence upon the ship for supplies. Their first visit, made at the time of the "Polaris" taking the shore, was a valued help, and their skill in the hunts was the reliance of the ship's company; on the other hand the number of visitors—at one time seventy-seven—was a trying infliction by their want of cleanliness. When as many as twenty-three began to sleep on the floor of Polaris House, snow-houses were built on shore for such as wished to remain near their white friends. By May 1, there had been one hundred men, women, and children at Polaris House, with as many as one hundred and fifty dogs.

On the 27th of the month two boats for the journey south had been built by the dexterity and care of Mate Chester; their dimensions were, length twenty-five feet, breadth five feet, and depth two feet five inches. On the two days following, active preparations were made for departure; on the second of these days almost all the land-ice broke away, and with it the "Polaris" went adrift, and was carried about two hundred yards towards the south, where she again grounded. At high tide her upper deck was about two feet below the surface of the water. Siemens and Hobby went out to her in the little scow and fastened two large hawsers to her from the rocks on shore. It was thought she might be driven high and dry upon the beach in the autumn, and furnish to the Eskimos a supply of wood. All of her which could be made use of by the ship's company had been secured, and either worked up or put into a condition for further use on the voyage. The rest of her history will follow that of

THE DRIFT OF THE FLOE PARTY.

Of the nineteen persons left upon the floe at the time of separation, some were carried off in that dread hour of the dark night, on broken pieces separated from the main floe, which was a large one; they were

brought again upon it by the boats, the articles which had been placed on these smaller pieces being of necessity abandoned. At midnight in a blinding snow-drift, the whole party huddled together under some musk-ox skins. Their provisions were not insufficient for their present necessities, and they had besides the two boats, two kayaks, a canvas tent, and some instruments of navigation. They were not far from the land, and in Tyson had a brave and able captain.

On their part and on the part of their fellow-sufferers on the "Polaris," the first natural object was to learn each other's position and re-unite. Quite remarkably, the floe party twice saw the ship on the day following the catastrophe, and made signals for recognition, but without success. Neither Chester, who "for several days was up and down the mast-head all day every ten or fifteen minutes," nor Hobby, famed for his sharp eye-sight, was able to distinguish a living being or a signal. Efforts to reach the ship as well as those made to get to land were alike unsuccessful. The sole expectation before the men on the floe was to drift with it; possibly at some happy hour, to get into open water for a safe boat journey south.

From this date their story, during the severity of a winter prolonged through March, is one of extreme suffering and extreme fortitude. As early as November the effects of exposure and want of proper food were plainly visible. The seals caught by the natives were almost the only available provisions, and these were hastily eaten, uncooked, and with the skin and hair on. What little remained of the ship's stores was given out by weight by an ingenious scale devised by Mr. Meyer. On New Year's day, Captain Tyson dined on about two feet of frozen entrails and blubber, and only wished he "had enough of that": the natives could catch nothing; "the daily allowance was a little mouldy bread." The rapid consumption of the stores was telling still more severely on the strength and endurance of all; signs of scurvy appeared. Before the month closed, however, seals were caught.

The first four days of February were dismal ones, as the Eskimos could find no water and no seals, and the sufferings of the children from hunger were painful to witness. The wind blew violently from

the north and west, and the snow drifted heavily; the temperature ranged from -16° to -22° ; but the weather moderating, on the day following these, Hans shot a small seal, which restored somewhat the spirits of the party. He had struck it just as it popped its head up through the young ice, and brought it from a distance of sixty yards by working his way to the floe in the kayak.

Before the close of the month, the allowance of provisions was again reduced one half—to a few ounces a day—the smallest quantity with which life could be sustained. A bear track was seen but lost; but thirty-seven dovekies were brought in, every part of which, except the feathers, was eaten. These birds are very small, twenty or thirty of them making only a moderate meal; nor do they make warm blood like the seal. The thermometer stood -30° .

After such long fasting, a too free indulgence upon an ook-gook, caught shortly afterward, brought new suffering, especially to those who ate of the liver, a number of whom were sick for a week, losing the skin of their faces, hands, and chests. So crazy had their appetites become that their hands and faces, at this feasting inside the igloo, were smeared with blood. On the 27th a fine large sea-bear was caught, of which every part, except the liver, tasted good.

April 1, it was found necessary to abandon the now wasted and unsafe floe; the party took to their only remaining boat. It was one intended to carry six or eight only; but at this time she had in her twelve men, two women, and five children, with the tent, some skins, and provisions. Finding her loaded too deep, one hundred pounds of meat, and nearly all the clothing were thrown overboard. Great pains were taken to preserve Captain Hall's writing-desk and papers. After making from fifteen to twenty miles south and west in the pack, a landing on the floe was again made at noon and a tent pitched. Seals were now so easily caught that no apprehension of want was felt.

On the 5th, under a westward gale and a fearfully high sea, pieces again and again broke from the floe, making it necessary to haul everything back towards its centre, one piece carrying Joe's hut, its inmates, however, escaping at the sound of the cracking ice.

The 19th was, perhaps, the most dangerous of all the days experienced by this party. At 9 P.M. a sudden alarm was given by the man on watch, when instantly a sea washed over the floe, carrying away the tent, the skins, and most of the bed-clothing. The one object now was to save the boat, for on this their lives depended; to do this it was necessary for the men to stand on each side and hold on with all their strength. The strong ook-gook lines which were fastened to projecting points in the ice, frequently parted, and every fifteen or twenty minutes a sea came, carrying the men with it to the opposite edge of the ice. Yet they held on from nine o'clock in the evening to seven the next morning, when they landed on a small piece of ice. The fatigue and danger could never have been borne but for the three meals made on the seal last shot by Joe.

And yet he was once more to be their preserver; for on the 22d, when the men were half drowned, cold, without shelter, and without food, on his fourth venture out on the ice, he saw a bear coming towards him. Hurrying back for his gun, he returned with Hans, and the two from behind the hummock, killed him instantly. But for this success the party must have perished.

THE RESCUE.

Relief, however, was now at hand. When the fog opened on the morning of April 30 a *steamer* was seen close to the floe, and at the boat's signals her head was soon turned towards them, and one hundred men on deck and aloft were returning three cheers given by the shipwrecked people.

The ship proved to be the sealing barkentine "Tigress," Captain Bartlett, of Conception Bay, Newfoundland. The position in which she lay was lat. 53° 35' N., off Grady Harbor, Labrador. The party thus rescued came in safety to the harbor of St. John's, May 12, and were brought to the Washington Navy Yard by the U. S. Steamer "Frolic," Commander C. M. Schoonmaker, June 5. The northeastern coast had been found blockaded by the ice and the prevailing east winds, and Commander Schoonmaker had passed more than one hundred bergs and floes in a single night.

It is the judgment of competent officers that nothing in all history has equalled the preservation of this ice-floe party: even the babe was saved. Too much credit can scarcely be given to the chief of the party, to the natives on whom all were dependent, or to the individuals themselves for their heroic fortitude. Nor is it less remarkable as represented in the report made by the Hon. Secretary and his colleagues, June 16, 1873, that, "after their rescue, although enfeebled by scanty diet and long exposure, and mentally depressed by their isolated and unhappy situation, so fearfully prolonged and of such uncertain issue, the general health of these hardy voyagers remained good, and when their trials and anxieties were ended, they soon regained their usual strength." The drift of the floe had been that of one hundred and ninety days. For the interesting details of the sufferings, hardy endurance, and final safety of officers, seamen, and Eskimos, the reader is referred to the volume of Admiral Davis, which has been named. The *track* of the floe will be found marked on the circumpolar map (Pocket of the present volume).

RELIEF SHIPS SENT FOR THE RESCUE OF THE "POLARIS."

The information brought by the floe-party concerning the situation of the "Polaris," when last seen by them, induced the Navy Department to take prompt measures for the rescue of her officers and crew. Two vessels were dispatched, the sealing vessel "Tigress," and the U. S. steamer "Juniata." The "Tigress" was further fitted out at the Brooklyn Navy Yard for all the dangers of Arctic navigation, and the possibility of wintering in the north; this delayed her sailing until July 14. Her higher officers were: Commander J. A. Greer; Lieutenant Commander H. C. White; Lieutenants Wilkins, Berry, and Sebree; with Captain Tyson, ice-master, and ranking as Acting Lieutenant.

The "Juniata" was made ready to carry coal and other supplies for the "Tigress," and to prosecute the search herself as far as was prudent for a vessel not built or strengthened for Arctic navigation. She was under the command of Commander D. L. Braine, whose chief under-officers were Lieutenant Commander Merriman, and Lieutenants De-

Long, Ide, McClellan, and Chipp. The "Juniata" entered Sukkertoppen July 17, Holsteinborg on the 18th, and Disco on the 29th. Here Commander Braine found the stores left by the "Congress" and the "Polaris" apparently in good order; he left coal and other stores for the "Tigress." At Upernavik, after consultation with Governor Rudolph, he endeavored to open communication with the "Polaris" by means of the Eskimos; they refused to go North. He learned that early in June two English steam-whalers had touched at Disco, and having been informed of the rescue of the floe party and probable condition of the "Polaris" had promised to keep a lookout for her on their passage north. He concluded that these whalers would examine the western shore of Baffin's Bay, and if the east coast were now examined by the steam-launch of the "Juniata," the "Tigress" might soon proceed on the direct route to Northumberland Island.

DELONG'S CRUISE IN THE LITTLE "JUNIATA."

The launch was sheathed, her bows were armed with iron, and her propeller guarded with an iron frame: her task would be to skirt the fast ice of the coast, collect all the information possible, and return by August 1, which would probably be before the arrival of the "Tigress" at Upernavik. She was provisioned for sixty days, and supplied with coal for seventeen days' full steaming, and was commanded by Lieutenant DeLong, whose officers were Lieutenant C. W. Chipp, and Ensign S. H. May with Mr. H. W. Dodge ice-pilot. The little "Juniata" steamed northward, winding her way among the icebergs and keeping close into land. August 4, she was shut up in a pack consisting, as far as could be seen, of solid ice from one to two feet thick, with large hummocks and icebergs; on the next morning she again entered the open sea, and on the 8th saw Cape York, but between it and the boat a solid pack of three or four feet in thickness through which an opening was looked for in vain.

The little launch was now in great danger; the wind had increased to a gale, the sea-spray was thrown over the tops of the bergs; the launch at times was half buried, shipping large quantities of water, and

it rained in torrents. She remained in this condition for thirty hours, during which a fire was lighted under the boiler only by pouring oil plentifully over cotton waste and junk, as the matches and tinder were wet, and it was several hours before a friction match, kept near the skin, had dried enough to be lighted. The return to port was necessary. DeLong therefore went back by another route, that of the mid-channel, and on the 12th communicated with the "Tigress," which had now arrived at Tessuissak, and rejoined the "Juniata" at Upernavik.

August 31, the "Juniata" sailed for St. John's, and on arriving there and informing the Navy Department that the officers and crew of the "Polaris" were reported to have sailed south early in June in boats, was instructed by the Secretary to continue the search; but at midnight of September 18, when sixty-five miles north of St. John's, was overtaken by the British steamer "Hector," which informed the commander of the safety of the "Polaris" party; grateful news, which, having been telegraphed from Dundee, where the "Polaris" party was, was taken out to sea from St. John's by U. S. Consul Mollon.

In the meantime the "Tigress" had sailed from Upernavik, July 11, examined Netik Harbor, on the 14th, and the same day, landed at the spot occupied by the Polaris crew the preceding winter.

The Polaris House was still standing, with its bunks, mattresses, furniture, galley, etc., but provisions, instruments, books, and stores were everywhere scattered along the shore. The "Tigress" took on board all the manuscripts, a mutilated log-book and all other books not torn into pieces; no cairn or place of concealment for records was found. Commander Greer was told by the chief of the Eskimos that, some time after the departure of the crew of the "Polaris," she had broken from her hawsers, forced further down towards the passage between Littleton Island and the mainland, and sunk. The broken hawsers were seen, and the chief said he saw the ship go down.

At this date an ice-pack extended across Smith Sound northward as far as the eye could reach. Commander Greer stood southward, passed Cape York near enough to have seen signals, but could learn nothing of the lost party on his way, or at Tessuissak or Upernavik. He returned to Godhavn. In accordance with his instructions to make

thorough search, after refitting at Disco, he crossed Davis Straits and tried to get into Exeter Sound, but found the ice packed tight to the shore. October 4, he made another run to the northward without meeting the objects of his search, and on the 10th of November anchored in New York. He had come to the reasonable conclusion that the Polaris party had been picked up by a whaler, having learned on this cruise that nine had expected to sight Cape York. The rescue thus anticipated by Commander Greer had been effected under the following circumstances.

RESCUE OF THE POLARIS PARTY BY THE "RAVENS CRAIG."

Six weeks after the rescue of the floe party under Tyson, the fourteen officers and men of the Expedition who had been left on the "Polaris" were ready to take up their still hopeful journey to the southward. While waiting the day of departure, Mr. Bryan and Dr. Bessels had visited Dr. Hayes' Port Foulke in order to determine the meridian difference between that place and Polaris House.

The stores which could not be carried away were now carefully deposited,* and on the 3d of June, 1872, the two boats' crews, under

* Captain Nares in the report of his voyage to the Polar sea says:

On a visit to Life-boat Cove, July 28, 1875, it was found that no part of the Polaris house remained intact, but pieces of wood, cases, empty tins, and other "odds and ends" marked the site. Within the cairn made on the departure of Budington's party nothing was found, but apart from each other, and without any protection were found four or five boxes each covered with heavy stones and containing many small articles of great use to the Eskimos, yet apparently undisturbed. A few books were found, but no pendulum, transit instrument, or chronometer. From the stores left by the "Polaris," the English Expedition of 1875 received much benefit, an acknowledgment of which will be found in Captain Nares' Report. Captain Budington had made three deposits; lists of which will be found on pages 668 and 669 of "The North Polar Expedition of 1871." Captain Nares says: "But for the valuable deposits of provisions established by the 'Polaris' at Hall's Rest, Lieutenant Beaumont would have found the greatest difficulty in obtaining supplies."

August 19, 1876, Captain Allen Young, of the "Pandora" (late the "Jeannette"), on a visit to Polaris Camp, found some relics of Hall's Expedition which, with the original records left on Littleton Island in a cairn by Captain Hartstene, U. S. N., when cruising in 1855 for the relief of Kane, he forwarded to the U. S. Government.

A bag of wheat was found at Polaris Bay, which was sent to the Arctic regions from the Smithsonian Institution of Washington, for the purpose of ascertaining the power of



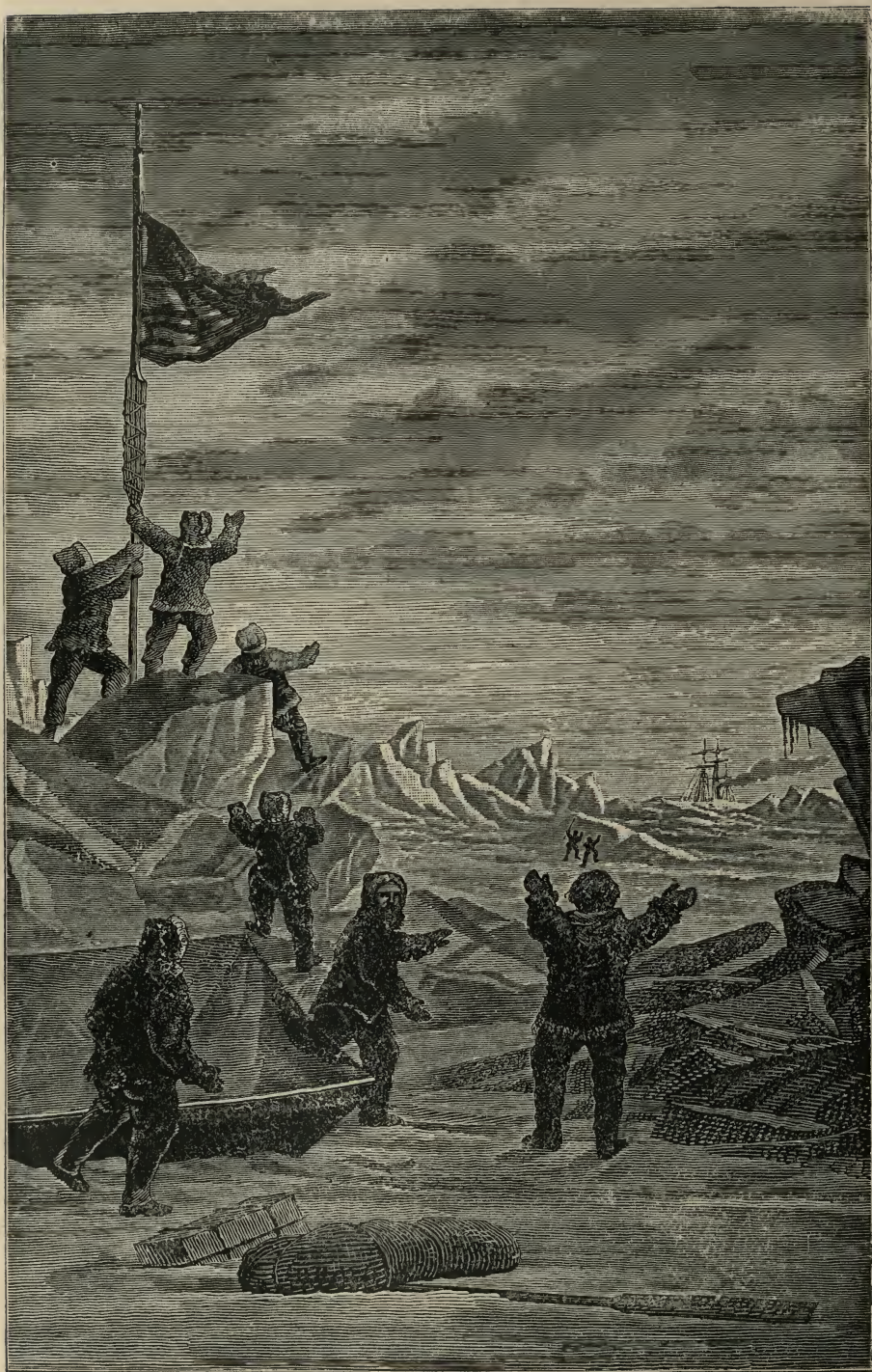
BUDINGTON'S PARTY LANDS ON NORTHUMBERLAND ISLAND.

Captain Budington and Mate Chester, left the shore of the Polaris house, lat. $78^{\circ} 23' 30''$ N., long. $73^{\circ} 21' 10''$ W. at 2.30 A.M., and stood down the coast with a fair wind, Chester being ahead. South of Cape Alexander they came to a loose pack which they could not enter, and returned to Sorfalik. Launched again on the 4th, they shaped a straight course for Hakluyt Islands to which they pulled by 9.20 P.M.; sleeping with some comfort among the rocks, but in the morning finding themselves covered with snow. On the 9th they effected a temporary landing on Northumberland Island, and on the 13th hauled up on Dalrymple Island.

On the 23d, after nearly losing one of the boats, caught between the floe and the pack, their rescue came in lat. $75^{\circ} 38'$ N., long. $65^{\circ} 35'$ W. At 10 A.M. of this eventful day, Mate Chester had electrified the company by calling out "Ship ahoy!" The "Ravenscraig" of Kirkcaldy, Scotland, a three-masted steamer, was distant about ten miles only, fastened to the land-ice. The Polaris flag was hoisted on two oars lashed together, and the barque answered the signal by running up her ensign as soon as her watch in the Crow's Nest could make out the boat flag. They had at first taken the Polaris men for Eskimos, or for a boat party from some lost whaler; this last idea had been corrected on their seeing that the people on the ice wore hats, since all the Scotch whalers wear caps. Captain Allen promptly sent ten men with ship-biscuit in their pockets, to relieve their anticipated exhaus-

cereals to resist the extremes of cold. After an exposure for at least four successive winters and three summers at Polaris Bay, out of a small sample tried at Kew, England, by Sir Joseph Hooker, sixty-two per cent germinated; the rest of this grain was returned to the Smithsonian Institution.

All the records and articles brought from Polaris Bay and the boat-camp in Newman Bay, together with the American ensign which was hoisted over the grave of Captain Hall, during the stay of our men in the neighborhood, were, on the return of the Expedition to England, forwarded by the British Admiralty to the United States Government. A chronometer found at the boat-camp, after four years' exposure to the vicissitudes of Arctic temperature, kept excellent time from the period of its arrival on board the "Discovery," until that ship returned to England in November, 1876. Sent by the Admiralty to Washington, it was, after being cleaned, issued to the U.S.S. "Quinnebaugh," on which ship it again did good service. Returned to the U. S. Naval Observatory on the termination of the cruise, it was reported by Lieutenant Moore as late as January, 1882, as having an excellent temperature rate. It is a trophy.



BUDINGTON'S CREW SIGHTING THE "RAVENS CRAIG."

tion, to bring them on board, and to communicate the grateful intelligence that their comrades on the ice-floe had been picked up.

The feelings of Captain Budington's party may be imagined. They had never doubted their ability to reach the Danish settlements, had accomplished one-half the distance, had abundance of provisions, and were inured to hardship, but the most dangerous part of their journey through the opening ice, the gales of wind, and heavy seas were still before their small, shallow, flat-bottomed, unseaworthy boats. At 6 P.M. the rescued men were on their weary tramp over the rotten ice and soft snow, arriving at the ship at midnight. Captain Allen, his surgeon, mate, and crew took every care of the suffering party.

The whaler not having finished her cruise, and being unfitted for carrying passengers, transferred them to other vessels homeward bound. Eleven arrived at Dundee in the "Arctic" September 19, and at New York, October 7, the remaining three reached Dundee in the "Eric" October 22, and New York in November.

By an act of Congress approved June 23, 1874, compensation and acknowledgment were authorized to be made to the owners, officers and sailors of all the relief ships, and also to each of the men who walked on the ice to rescue Captain Budington's party. The captains of the "Ravenscraig," "Arctic," "Intrepid," and "Eric," were further informed by the Navy Department that each was at liberty to purchase a gold pocket chronometer, and to have inscribed thereon that it was a token of the gratitude of the United States for their kindness to the officers and men of the "Polaris."

RESUMÉ OF HALL'S THREE EXPEDITIONS.—HIS CHARACTER.*

The three Expeditions of Captain Hall, together with the weary labors of preparation preceding each of them, are his best memorials. The narratives of his first voyage and of his third—the "Polaris"—are

* The judgments expressed in this Resumé, which was prepared by the author for the close of "Hall's Second Expedition," have been since fully confirmed by those expressed in a number of letters received from Arctic voyagers, including Captain Allen Young. The truthfulness of some of Hall's statements in his notes will be found confirmed in the next chapter of this volume. And it should be said here, once for all, in reply to a recent com-

sufficient to disprove the idea sometimes hastily expressed that he was a mere ignorant and visionary dreamer; and the impress on the minds of those who have inspected the precise and often graphic journals of his Expeditions, has been such as the evidences of a continuous frank truthfulness create,—the manifestation of an indomitable will, energy, and perseverance in the devout pursuit of the two objects which have been discussed. He believed them attainable, and believed himself called to them as to his life-work.

The testimony of one who, next to his constant friend, Mr. Grinnell, could best estimate his character, is emphatically clear to the point that Hall was a single-minded, trusting man, who believed that others were like himself, and that he would find them such. In this he often found an experience of disappointment. His enthusiasm concerning his favorite object was extreme and abiding, and gave tone and color to all his words and acts. His very want of general knowledge, and his deficiencies in special departments of science made him more fit for an explorer than a scientist could have been. He looked upon explorations and all which appertained to the increase of geographical knowledge as far above all else; and this explains the career of one who had such a childlike purpose. The more information he could gather the happier he felt. It was indeed the disappointment produced by the obstacles thrown in his way on his third Expedition which probably caused his death. In the lack of all personal acquaintance with Hall, this judgment, expressed by Mr. J. Carson Brevoort, of Brooklyn, and confirmed by that of others in the city of New York, as well as in New London, and Washington, has been the more willingly received by the writer of this narrative.

Official and other public acknowledgments of Hall's worth have freely appeared in the language of the National Academy of Sciences at the time of the going out of the Third Expedition, in the trust re-

plaint from the English Captain, W. P. Snow, that "Hall was not the author of the 'Arctic Researches,' published by Harper Brothers, in 1864," that Hall's journals and notebooks of his Second and Third Expeditions so closely exhibited the same style and characteristics with the language of the "Researches" of 1864-69 as to identify him unquestionably as the author of that volume. Captain Snow was for a short time only Hall's assistant in preparing it. His own English naval record is acknowledged. •

posed in him by the Executive when granting him the commission of Captain of the "Polaris" in 1871, in the award of the gold medal of "The Roquette Foundation" by the *Société de Géographie* of Paris, and in the tributes paid to his worth by Captain Sir George Nares at his grave in the far north, and in his official report of the English Expedition of 1875.

The extreme discomforts, exposures, and labors incident to a residence among the Eskimos were not unforeseen when even he entered



Medal awarded by the Geographical Society of Paris, to Captain C. F. Hall, as the "promoter-in-chief of the Polaris Expedition, and as otherwise due him for his previous labors." For the Report of the Commission of Award, V. A. Malte-Brun, chief, see the Bulletin of the Society for the year 1875, and Admiral Davis' volume, page 625. An electrotype of this medal, struck at the Mint in Paris, was part of the Arctic Collection placed by the U. S. Naval Observatory at the Centennial.

upon his First Expedition; and his experience then must have necessarily led him to anticipate that greater trials would be his lot on a longer banishment from civilized life, and the comforts of home. But he avowed with sincerity that he would be willingly absent for a term of ten years at least if he saw a prospect of success. He felt that he could trust his two Eskimo friends during so long a stay, and yet it seems surprising that with even their help he could on his second voyage control unharmed so many of the Innuits, subordinate their chief, Ou-e-la, to his purpose, and secure with such slender resources as much success as he attained. His notes say: "Nothing but an experience of years could enable me to control such untamable eagles." Certainly the presence or at times expected return of the whalers to

Repulse Bay and other localities, had much to do with his ability to maintain his authority, and next to this was his ability to supply the wants of the natives when suffering; and yet, perhaps, above both of these, must be placed his politic concessions to their low prejudices and his self-control. Very frequently in his journals appear proofs of hasty judgments, and of suspicions of evil intentions against himself by the whaling captains as well as the Innuits, but as frequently appear also proofs of his repressing such feelings, and of his recording his regrets at having given place to them in his heart or in his notes. The numerous delays experienced by his restless spirit from the indolence, and especially from the superstitions of the natives — delays too at critical times — were trying to the temper. They were placed to the wrong account when they gave room for his imagination to credit them to purposes of evil. But his feelings were naturally stirred with something besides pity when he found himself unable to obtain proper assistance in the hut, or move forward on a journey because the Innuits would neither eat nor suffer others to eat on a given day, or work until a certain time was passed, — to estimate all which aright, Hall must be thought of as a single white man alone among the degraded, and habituating himself to such degraded modes of life with them as can be excused only in the light of his subordinating everything to his one purpose, and of his so living in order to avoid the visits of the scurvy. He experienced none of these.

It will be a harsh criticism which pronounces his judgment defective or his exercise of it hasty. He demonstrated the correctness of the belief he entertained from the first, of his being able to live for a long period out of the pale of civilized life by his own passing through it thus without any protracted or extreme suffering. He was not then far out of the way in supposing that some of the Franklin men might possibly be found as survivors among the Eskimos.

His ability, industry, and perseverance manifest themselves in the long continued absence from the endearments of his country and home; and in his victories over what seemed to be insurmountable. Through the years of struggle for an outfit, hope was more than once nearly crushed at the moment when success seemed sure; at the time of his

first landing on the Second Expedition, the mistake of his captain cost him a whole year's advance; on his first practicable advance movement his frightened party then turned back their steps; when provisions and stores were again ready, he could secure no team, and, after a severe journey in mid-winter on his return, could obtain no men; and when at last at the end of the fifth year of the Second Expedition — the ninth of expectation and of effort — he stood on King William Land, it was to be hurried away before the summer sun could lift the snow pall from the treasures he was seeking.

Would it not have been the record of many others that after grappling with some only of such difficulties, they would have found themselves at the close of any one year of disappointment, safe on board the hospitable whaler? Would not many have justified themselves when returning to their country and reporting insuperable obstacles? Expeditions largely equipped and led by men of Arctic experience and brave heart, have more than once so returned to be justified and honored by their countrymen. Hall had an unconquerable determination to accomplish something, and if this be called a mere enthusiasm, it was an enthusiasm which led him to endure and fight his way, and patiently await new issues and endure and conquer. Without such an iron will, he would never have remained within these desolate regions through five Arctic winters, enduring the squalid wretchedness of the snow-huts; nor have made his sledge journeys to Pelly Bay, to Cape Weynton, to Ig-loo-lik, to Fury and Hecla Straits, to Lyons Inlet, and to King William Land; aggregating more than three thousand miles. His voyage out to the Arctic Regions and return, and his surveying work around Repulse Bay, and the sledge journeys just referred to, foot up a considerable excess over ten thousand miles.

It has not been out of place to say that besides the extreme of enthusiasm, a fascination for Arctic life laid hold upon him — the fascination which in one form or another makes the traveller restless while off from his journey as it does the sailor when off the sea; a fascination which has been one of the features of the most interest in all the records of the Arctic Explorations, notably in the case of the renewed voyage of Franklin when he with Back, went out on his second

land journey. If it seem strange to the landsman that the shipwrecked mariner is ready for a new cruise, and in his own feelings sometimes, safer in a storm at sea than on land, it is as strange to contemplate the eager return to Arctic adventure and dangers by such sufferers as Franklin, Back, Richardson, Hall, their comrades and followers. Faith in an overruling Providence and in the cardinal doctrines of the Christian religion was evidently inwrought in them; in Hall, probably, from the date of his earliest home-training. Full expression of this is found in his journals.

The weakest part of the record for the years of which the narrative, especially of the Second Expedition, speaks, is, perhaps, his permitting himself to turn aside from the long-proposed journey to King William Land and lose a year by his visit to the Straits of Fury and Hecla. His motive, however, for this was sincerely in keeping with the purposes of the Expedition. The *possibility* of yet finding a survivor of Franklin's party again loomed up before his enthusiastic view, and he thought himself fully justified in making search for traces of those of whom the Innuits so confidently and unitedly spoke as existing in the peninsula. In confirmation of this last remark, it is in place here to refer to the following recent statement in relation to this visit to these Straits. Captain William Adams, of the Dundee whaler "Arctic," on his return from his cruise of 1881, reported that while his ship was within fifteen miles of Fury and Hecla Straits, a young and intelligent Eskimo told him that when he was a young man in his father's hut, three men came over the land toward Repulse Bay, and that one of them was a great captain when he died. The other two were in sore distress, and cried very much, stating that he was the "anigak," or great captain. These two lived some time in his father's hut, and he showed Captain Adams the spot on the chart where they were buried. The Eskimo, continuing his narrative, said that seventeen persons started from two vessels which had been lost far to the westward, but only three were able to survive the journey to his father's hut. Strange traditions!

From all the information furnished by the Eskimo, Captain Adams has no doubt that the vessels referred to were those of the Franklin Expedition, and that the great captain mentioned was Lieutenant

Crozier. "Assuming that what the Eskimo stated was correct, it is beyond doubt that the members of the Franklin Expedition were attempting to reach the Hudson Bay Territory." Judging from the present age of the native, Captain Adams is of opinion that his allusion to having seen the men when he was a young man must refer to a period some thirty-five years ago. Captain Adams is the navigator who rendered assistance to the floe party from the "Polaris," which was rescued by the "Ravenscraig." If Hall's judgment was at fault, his motives were as commendable as they had been when expressed in the draughting of the plans for his first outfit, or when he wrote in answer to Lady Franklin's proposal that he should go out a third time for the record: "As for pay, I should ask nothing."

Sir George Nares, commanding the late English Expedition of 1875, has recorded in his official report to Parliament his testimonials to Hall's fidelity as an Arctic explorer:—

"The coast-line was observed to be continuous for about thirty miles, forming a bay bounded toward the west by the United States range of mountains, with Mounts Mary and Julia, and Cape Joseph Henry, agreeing so well with Hall's description, that it was impossible to mistake their identity. Their bearings also, although differing upwards of thirty degrees from those of the published chart, agreed precisely with his original report. It was impossible to mistake their identity."

HALL'S GRAVE.

The grave in which Captain Hall was buried, Nov. 10, 1871 (see Chap. VIII., page 298), in the month of July following, was found undisturbed, and was then made to present a better appearance than had been found practicable in November, when the ground was frozen. It was surrounded with stones, soil transported to it and a few plants set out. A head-board bore the inscription:—

To the memory of
C. F. HALL,

Late Commander of the North Polar Expedition; died Nov. 8, 1871.

Aged 50 years.

To which inscription in July, 1872, Mate Chester added the words:—

“I am the Resurrection and the Life: he that believeth on me, though he were dead, yet shall he live.”



CAPTAIN HALL'S GRAVE.

On the 13th of May, 1876, in the presence of twenty-four officers and men, Captain Stephenson, of the English Expedition, hoisted the American flag over the grave of Captain Hall, and at the foot erected a brass tablet which had been prepared in England, bearing the following inscription:—

Sacred to the memory of
CAPTAIN C. F. HALL,
Of the U. S. S. "Polaris,"

"Who sacrificed his life in the advancement of Science, November 8, 1871.

This tablet has been erected by the British Polar Expedition of 1875,

Who, following in his footsteps, have profited by his experience."

He also reported to Captain Nares that the grave was found in an excellent state of preservation. The willow planted by Tyson was still alive.

THE ESKIMOS. — HALL'S COMPANIONS.

At the close of this narrative of Hall's work, it may be conceded as something due in simple justice to the two Eskimos who have been so frequently named within the previous pages, that a few items of their personal history be recorded. Through all the trials of Hall's three expeditions — a period of more than ten years, — they were not only his steadfast friends, but indispensable supporters, without whom he could never have carried forward his investigations, or have kept, in some emergencies, even his life among the Innuits. Joe Ebierbing was, as has frequently appeared in the narrative, Hall's dependence as hunter. On repeated occasions, by his native skill in the use of the lance and line and by his readily learned use of the rifle, he procured food in the darkest days of want, not for Hall alone, but often for the less skilful and suffering Innuits around him; materially aiding Hall by this beyond the bare support of the lives saved, and gaining for the expedition lasting good will and help. Hannah was perhaps the more intelligent, and, as a woman, naturally of quicker perception in the things of every day life, which would serve the necessities of the white man among strangers. She proved an interpreter without whom every effort to understand the natives of Cumberland Gulf, of Repulse Bay, of Ig-loo-lik, of Pelly Bay, or of the country on the route to King William Land would have been hopeless, — every one of Hall's journeys and talks with the Innuits nearly useless.

But beyond all this, the heroic conduct of these two on the last of Hall's voyages claims a tribute. It must be very plain to every reader of the narrative of that "Polaris" voyage that these Eskimos saved the lives of Tyson's party on the fearful ice-floe drift of more than one thousand two hundred miles.

In the early days of that suffering, when the floe was drifting past Cumberland Sound and was nearly opposite their native place, the temptation presented itself to this couple to escape to the mainland. "Father Hall" was gone from them, and, at that time there were just grounds of fear within their breasts that, in the almost famishing con-

dition of the white men, some of them might make the Eskimos the first victims, if the direst necessity should come.

Hannah listened to no words of such persuasion, but strengthened Joe's purpose to remain; a hunter for the seal and the bear was thus still to be at hand for the saving of men whose skill in such hunts was plainly as unequal to their need as was their diminished strength. Of his true worth in this respect, the most convincing proof came toward the last days of those dark months. The story of this is told in full on the 568th page of Admiral Davis's Narrative, where it will be found recorded that on the 22d April, 1873, when Tyson's party on the floe, weakened by their six months' exposure, were on that day, half drowned, cold, and almost literally without a morsel of food, Joe, on going out for the fourth time to watch, saw a bear coming toward the party, hurried back for his gun, and, requesting all hands to lie perfectly still, returned with his companion *Hans*, and with his aid instantly killed the ferocious animal. At this point in his narrative Admiral Davis says: "But for the rifles in this extreme emergency, this story would not have been written."

Joe and Hannah were natives of Cumberland Inlet, where Captain S. O. Budington, of Groton, first met them in the fall of 1851, on the Island of Kim-ick-su-ic,—an island that gets its name from its flat centre, which, covered with grass, gives it the look of a *dog-skin*. Captain Budington wintered there in about lat. 65° 30', long. 62°, when in command of the "McLellan," of New London. Hannah, who was born at Cape Sorrel on the west side of Davis Strait, was at the time of Captain Budington's visit only about twelve years of age, and Joe, who was then married to another woman, seemed to Budington at that time "as old as he does to-day." Cape Sorrel was a whaling station, much visited by English and American sailors, and frequented by the Eskimos of Cumberland Gulf for trade. A few years afterward, Mr. Bolby, a merchant of Hull, became much interested in these two persons, and took them with him in his own vessel on his return voyage from the Gulf. In England he treated them as his guests with great liberality. They were married in his house in the presence of a large company, and, with Mr. Bolby, visited in their native costume many

places in England and Scotland, and were presented to Queen Victoria, and dined with her and the Prince Consort. Hannah always spoke of the Queen as "Very kind, very much lady."

Hannah's willingness to leave her country seems to have been produced by her desire to keep her husband with her; he was at the time being persuaded to leave her for another wife. His uncle U-gack was reported as having had twenty wives, three of them living with him at one time. At the time of Hall's return to the United States, Joe, who had been sick, was ordered by the an-ge-ko to take another wife as the only way to get well; but to his own best future success, as is well known, he came over with Hannah to the United States. His father had died when quite young: his half brother Ita-loo, left on the island, was met with in the year 1873 by Captain Greer, U. S. N., of the relief ship "Tigress," came with him to New York, spent the winter in Groton, and died shortly after getting back to his native land.

Joe and Hannah after, as has been shown, assisting Hall in his preparations for the Second Expedition, and closely attending him through the years 1864-69, again accompanied him on his last voyage in the "Polaris," 1871, and returned to the United States with the floe party. They were as much attached to "Father Hall" as he was to them.

In a home purchased for them by him, in Groton, Connecticut, they soon commenced housekeeping in 1873, readily adapting themselves to the customs of civilized life. Joe became a good carpenter and farm hand, retaining his old love for fishing. Hannah was soon skilful in making up, with the help of her sewing-machine, furs and other salable articles for the people of New London and Groton.

Their first child, Tu-ke-li-ke-ta, had died in New York in the winter of 1863; the second had been buried on the first sledge journey to King William Land in 1866; a third, which Joe adopted in 1868, with the consent of its parents and by the gift of a sled to them from Hall, came with him to the United States in 1869. Hannah named the child Sylvia, after her friend Miss Grinnell. The girl was an intelligent scholar at the Groton school until her death in 1875.

The health of this couple had been repeatedly broken during the long period of suffering of the years 1864 to 1869; and they do not

seem to have been readily acclimated in the United States. The ter-



OU-SE-GONG (JEANNIE).

rible experience of the ice-floe especially had left severe traces on them. During the year 1876, Hannah suffered much with that fatal disease consumption; a disease which carries off the larger number of her race. It had been long gaining upon her. She bitterly felt the loss of her last child and the absence of her husband, who, after having been again out in the Arctic regions with

Captain Allen Young, of the "Pandora," was then doing good service on board a vessel belonging to the United States Fish Commission. Hannah had become a true Christian; read her Bible, and showed a quiet, good life. After a season of protracted suffering, throughout which she was tenderly cared for by Mrs. Captain Budington and other friends in Groton, she breathed her last, as the old year went out, December 31, 1876, at the early age of thirty-eight.



KUD-LUP-PA-MUNE (ABBOTT).

Her death was tranquil. Among her last words was the petition, "Come, Lord Jesus, and take thy poor creature home!"

In June, 1878, Joe again sailed for the Arctic zone with the party sent out by Morison & Brown, of New York, and commanded by Lieutenant Schwatka, U. S. A., to prosecute a renewed search for the records of Sir John Franklin's Expedition. Mr. J. Carson Brevoort, of New York, Mr. J. J. Copp, Captain Budington, and others had unhesitatingly renewed their indorsement of the industry, honesty, and truthfulness of this simple-minded Eskimo man, who has received from the U. S. Government much less compensation for noble services than perhaps any other one of the "Polaris" Expedition. He has not returned to the United States.

MEMORIALS.

In the quiet cemetery on the hillside of Groton, may be found a few tombstones set up by its citizens in memory of nearly all the Eskimos who have visited the United States. One of these stones bears the name of him who, going out with Hall, died on board the "George Henry" while eagerly inquiring as he again neared his native land, "Do you see ice, ice?"

KUD-LA-GO,

Died July 1, 1860.

On another tombstone will be read, —

OU-SE-GONG (Jeannie).

Died July 1st, 1867. Aged 28 years.

Ou-se-gong was a cousin of Joe, and wife of Kud-lup-pa-mune, known by the whalers as "Abbott."

Captain Budington brought these two Eskimos from Cumberland Inlet to New London in 1866; on their return with him the next year, Jeannie died on the voyage. Two smaller headstones put up for Hannah's children have on them the inscriptions: —

TU-KE-LI-KE-TA.

Died Feby. 28, 1863. Aged 18 months.

And

SYLVIA GRINNELL EBIERBING

(Punna).

Born at Ig-loo-lik, July, 1866.

Died March 18, 1875.

"Of such is the kingdom of heaven."

"She was a survivor of the Polaris Expedition under Commander Charles Francis Hall, and was picked up with nineteen others from an ice-floe, April 30, 1873, after a drift on the ice for a period of one hundred and ninety days and a distance of nearly twelve hundred miles."

On a visit to these graves in 1878, when making inquiries of Eskimo Joe in regard to some facts for use in the Narrative of "Hall's Second Arctic Expedition," he was observed to kneel at Hannah's grave and carefully weed out the long grass. Then turning to his visitors he said, "Hannah gone! Punna gone! me go now again to King William Land; if have to fight, me no care."

Over the grave of the faithful Hannah, the interpreter of each Expedition, and the friend who wept at Hall's burial, has recently been placed an elegant granite headstone with the monogram J. & H. and an inscription, designed for her by Mr. J. J. Copp and other true friends.



LIEUTENANT FREDERICK SCHWATKA, U.S.A., MEDALLIST OF THE
SOCIÉTÉ DE GÉOGRAPHIE, 1883.

From "Schwatka's Search," by W. H. Gilder. Charles Scribner's Sons.

CHAPTER IX.

SLEDGE JOURNEY OF LIEUTENANT SCHWATKA, U. S. A.

REPORTS FROM HUDSON'S BAY WHICH OCCASIONED THE JOURNEY.—SAILING OF THE "EOTHEN."—ARRIVAL AT DEPOT ISLAND.—THE TRUE STORY OF "THE SPOON."—DECISION TO CROSS TO KING WILLIAM LAND.—MEETING WITH THE INNUITS; THEIR STORIES.—VISIT TO THE CAIRN.—REMAINS OF LIEUTENANT IRVING, R. N., IDENTIFIED.—JOURNEY TO CAPE FELIX.—NO RECORDS FOUND.—RELICS OF FRANKLIN'S EXPEDITION.—CAMPING OUT AND SLEDGE JOURNEY, OCTOBER, 1879, TO MARCH 4, 1880.—RETURN TO THE UNITED STATES.—AWARD OF A MEDAL BY THE GEOGRAPHICAL SOCIETY OF PARIS.—RECOGNITION OF THE WORK BY CONGRESS.

IT has been shown in the previous chapters, that the sole official or other record which ever has been received from the ships of Sir John Franklin, is the paper found by Lieutenant McClintock, R. N., in 1859. The furthest exploration made by Captain Hall, as related in Chapter VII., was in the region of the wrecked ships; but Hall learned as to the existence of records or journals merely the traditions and stories of the Neit-chi-lis, that in the cairns which he was unable to visit, books and papers might be found. This report he published through the press on his return in 1869; he contemplated a new journey for them.

The value of the records to the English Government and to science, as well as to history, still left in the minds of some a lingering desire for further search. In 1875 it was one of the objects of Captain Allen Young of the "Pandora" (late the "Jeannette," under Lieutenant DeLong), who states in his history of the two voyages, that the purposes of his first voyage were to visit the western coast of Greenland, thence to proceed through Baffin's Sea, Lancaster Sound, and Barrow Strait, towards the magnetic Pole, and, if practicable, to navigate through the northwest passage to the Pacific Ocean in one season

adding: "As, in following this route, the 'Pandora' would pass King William Land, it was proposed, if successful in reaching that locality, in the summer season, when the snow was off the land, to make a search for *further records* and for the journals of the ships 'Erebus' and 'Terror.'" Captain Young, however, found himself beset by an impenetrable pack at the Roquette Islands in Franklin Channel, one hundred and forty miles from Point Victory, — a disappointment which was more severely felt because, the day before, his ship had run southward through Peel's Straits with a clear sea; with no sign of ice, and with every prospect of reaching King William Land, and accomplishing the northwest passage.

Three years later, the search for the records was renewed by Lieutenant Schwatka, U. S. A. For the recovery of these long-desired treasures, nothing was accomplished, simply because nothing was possible; but the journey has added facts of value to the domain of Geography, and its records exhibit an experience of remarkable energy, perseverance, and fortitude, entitling it to a worthy place in the story of American Exploration. The sledging has no parallel in Arctic history.

The immediate occasion of the Expedition was the renewal of the old story brought back from the Neit-chi-lli Eskimos by two American whaling-masters, Captains Potter and Barry, that books and papers were to be found in a cairn in King William Land. The first of these stories seems to have been related by Captain Potter in 1872; he had been frozen up twenty-four months in Repulse Bay and thence brought to New York, spoons, forks and knives engraved with the crests and initials of Franklin, Crozier, and Fitz James; reporting that the Neit-chi-llis had spoken of papers and books laid away in a cairn by the last white man who had visited their country. This report, again renewed in 1877, on the return of Captain Barry, one of Potter's former companions, opened up the presumption that the books might be the ships' logs and notes of scientific observations. For their recovery the British Government for many years had held open a large reward, and although this had now lapsed, Messrs. Morrison and Brown, owners of Barry's vessel, the "Eothen," were officially informed that if the proposed search were

successful, liberal compensation would be made. Lieutenant Frederick Schwatka, of the 3d U. S. Cavalry, of Polish descent but American birth, had previously become eager to organize a search party and find the cairn and buried papers; on conference with the shipping merchants named, his offer to organize an expedition was accepted and the ship fitted out by private subscriptions. The enterprise was encouraged by Judge Daly, President of the Geographical Society of New York, who endorsed the Lieutenant's application to General Sherman for leave of absence from regular army duty.

June 19, 1878, Schwatka sailed from New York accompanied by Mr. William H. Gilder as second in command; Henry Klutschak, who had passed through some Arctic experiences; Melms, an old whaler; and Joe Ebierbing, who had returned from his last Polar Expedition, under Captain Young of the "Pandora." The "Eothen," commanded by Captain T. F. Barry, was a stout vessel of one hundred and two tons; her crew numbered twenty-three men. For encounters with the ice, her hull had been overlaid to the chain plates with oak planking one and a half inches thick, and her stem, covered with oak two feet thick; the iron plating on it, three fourths of an inch. In addition to a fair outfit, including arms and ammunition, boxes were shipped in the hopeful idea of the records, and tobacco stored in abundance for the use of such Eskimos as might have stories to tell or assistance to offer. Horseradish was taken as an anti-scorbutic.

Within the instructions furnished to the Lieutenant, he was advised, that, if he should be so fortunate as to find the records, remains, or relics, their contents should be kept secret; and if he should find the remains of Sir John Franklin or any of his party he would properly take care of them, and bring them to the United States. Should the expedition prove a failure in its chief object, he was to make it a geographical success, as he would be compelled to travel over a great deal of unexplored country, and would make daily observations and be able to discover and mark errors on the existing charts. This Schwatka effected.

The first iceberg was seen July 11. On the 19th in lat. $59^{\circ} 54' N.$, long. $60^{\circ} 45' W.$ before midnight nearly seventy at different hours were

in sight; one, says Captain Gilmer, appearing like a huge circus-tent with an adjoining side-show booth, while near by, another was a most perfect representation of a cottage by the sea, with gables towards the observer and chimneys rising at proper intervals along the roof; one other seemed a perfect counterpart of Newstead Abbey: the ivy seemed creeping over its sides, so deceptive were the shadows that fell on it from pinnacles and horizontal projections innumerable."

August 7, 1878, the ship reached Whale Point at the entrance of Rowe's Welcome, an arm of Hudson's Bay, and was soon visited by a large number of the natives, among whom were Ar-mou (the wolf), I-ke-mer (fire), and Ar-mou's brother, Too-goo-lan (Pa-pa-tewa), companions of Captain Hall on his Second Expedition. All the people seemed friendly, and on consultation over the charts, it was decided to go on to the mainland near Depot Island, and spend the winter. The journey westward would be begun in the early part of the spring.

But with deep regret it was at once learned that one of the two Neit-chi-llis of whom Barry had spoken as talking while looking at the ship's log, of "the big white man who many years ago had kept the same kind of book, and hid it in a cairn," had died, and nobody knew what had become of the other man. Schwatka, nothing daunted, pitched his tent on shore, lat. $63^{\circ} 51' N.$, long. $90^{\circ} 26' 15'' W.$, and determined, in place of returning to New York, as he would have been justified in doing, to make during the following summer a final and conclusive search. The Arctic winter up to April 1st was therefore spent in the igloos. It inured the party to the climate, and occasional sledge journeys, and taught them how to clothe themselves and otherwise provide against the cold. During the winter, further news of the relics was by no means more encouraging than that already received. From Nu-tar-ge-ark a man of about forty or fifty years of age, it was learned that his father many years before had taken out from a cairn on King William Land, a tin box containing paper with writing on it (the same account of the box and paper with that given by Captain Hall in 1866), the additional statement being at that time made to him, that the paper had been "thrown away as of no use to Innuits." The native, however, spoke further to Gilder of a cairn within which the Innuits

believed something lay still buried beneath a very heavy stone which had been undisturbed. A spoon brought from King William Land by Nu-tar-ge-ark had been given to Captain Potter.

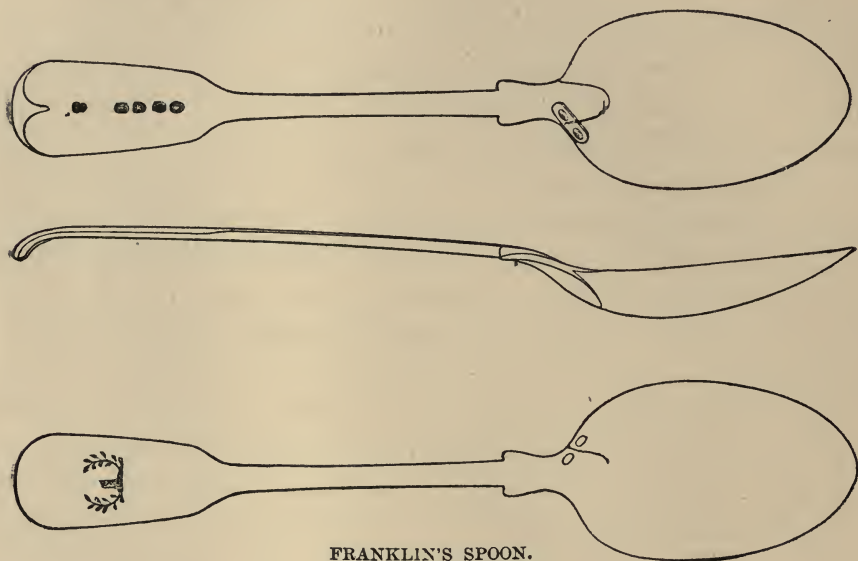
Mr. Gilder's first errand then was to find the captain, and in this he succeeded on a visit to Marble Island in January, 1879, when Potter, then second in command of the whaler "Abbie Bradford," unhappily exploded the story which had been the chief means of bringing Lieutenant Schwatka from the States. This he felt constrained to do by showing that the assertion made by Captain Barry that he had understood Innuits talking to each other about "the big man who many years before had been seen with a big book like the ship's log" was supremely ridiculous; for probably no white man in the Arctic could have understood the conversational language of those natives, so different from the "pigeon English" they use in communicating with the whalers. In this crucible of fact, says Mr. Gilder, the famous spoon* melted. So far as Captain Barry and his clews were concerned "we had come on a fool's errand."

The final search, however, was not to be abandoned, and this decision was afterward fully justified by the labors of the Expedition and its results. The commander knew what was before him, and with whom he had to deal, and would not return empty-handed. To verify the statements made by Nu-tar-ge-ark and other natives—nearly the same with those made to Captain Hall in 1869—(see Chap. VII. p. 266), "that very many skeletons still lay on the ground in King William Land, invisible in winter by being covered with snow,"—as well as to determine finally in regard to the Records, a journey would now be undertaken to the distant regions. For this, the first thing necessary was to get full dog-teams, for which Gilder set out on a visit to the Kimmepatoos, seventy miles west and north from Marble Island. He was the first white man to visit them, the first ever seen by a number of them; but all were friendly, even at his first entry to their igloos.

* The famous spoon brought by Captain Barry to New York had been sent by the writer for Morrison & Brown of New York, from the Naval Observatory through the State Department to Miss Sophia Cracroft, London, niece of Sir John Franklin. The cut on the next page is a fac-simile. It was unquestionably one of Franklin's, and acknowledged as such in England.

Remaining with them a week, he witnessed the performance of the Key-low-tik, which has been described in Hall's narrative, and says that he frequently "grew weary and slept through it," but that it would cause a sensation in New York.

On his return from the village, after securing a few dogs, Gilder discovered two lakes, which he named respectively Brevoort and Duryea,



FRANKLIN'S SPOON.

Fac-simile of a spoon brought from Repulse Bay to Morrison & Brown of New York, and sent by U. S. Naval Observatory to Miss Cracroft, niece of Sir John Franklin. Mending done by the Eskimos.

and reconnoitred the southeast shore of Depot Island, the mouth of Chesterfield Bay and its Islands, and Marble Island; he also discovered a river which he named the Connery, and which by its course appeared to indicate the proper route to King William Land.

Within the same period, Lieutenant Schwatka made a preliminary sledge journey to the North, discovered a river which he named Lorillard, and a chain of hills which he named the Hazard Range; to their summit he gave the name Wheeler. By astronomical observations and surveys, he determined that the west coast of Hudson's Bay in that section had been laid down on the charts about 2° too far to the West.

April 1, 1879, he began his sledge journey of eleven months covering a distance of three thousand two hundred and fifty miles, accompanied by thirteen Innuít men, women, and children. Their sleds, drawn by forty-two dogs, bore weights of about five thousand pounds — loads which would be each day lessened by the rationing of the walrus-meat to men and dogs. It was scarcely more than a month's supply, but the party were reasonably expecting to get their subsistence from the game which they would continually find to increase in number with the opening season. Their general course was north-northwest; it was the most direct route, but led them across land up to that date unvisited by a white man, and unknown to the Innuits.

For the first few days the journey was one of exceeding fatigue, the men having more than once to put on their *rue-raddies* (harness) in order to help the dogs over some ridge or through a snow-drift. They crossed the Connery and the Lorillard rivers, and on April 27, by the *Chart*, they should have been on the Wager River, but saw nothing of it; a fact which may explain Hall's being landed at the mistaken point, as named in this volume (Chap. VII., page 210). The charts of Hudson Bay have misled the whalers. By the 21st they were in lat. 65° 45' across the Wager River; and by May 9th were following a branch of Back's or Fish River, which they named after President Hayes. On this river, May 15th, they fell in with a party of Ook-joo-liks whose chief gave them their first direct news of the missing navigators. Their coming near to this party was first made known by the excitement among the dogs which started off on a brisk run with loud barking; the Innuits at once said that this showed that people were not far off.

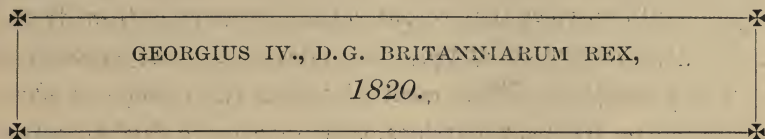
Schwatka's Innuits, including Joe, were much frightened, but were reassured by his calling their attention to the difference between breech-loaders and Innuít bows and knives. In fact, on coming nearer to the nine men, it was found that they had been even afraid to come out of their igloos until they heard the name of one of the Innuits, and although they all carried knives, these were but bits of hoop-iron or copper. They were also miserably poor and without food. Supplied by Schwatka with reindeer-meat, of which he had already found abun-

dance, they became very friendly, assisted in building igloos, and gave further valued information of Franklin's party. This was in part substantially the same with that learned by Hall, viz.: that a ship had been found in the ice off the west coast of Adelaide Peninsula, and that knives, spoons, and utensils had been taken out by cutting a hole into the ship on a level with the ice, as they did not know how to get inside by the doors; they saw no bread; they saw books on board and left them there; and when the ice broke up in the following summer, the ship filled through the hole they had cut, and sank.

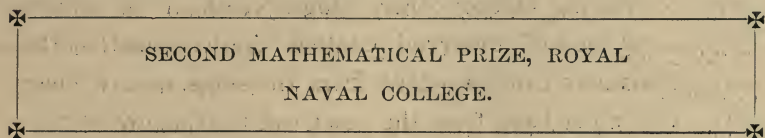
Taking some of these men into his company, in four more marches Schwatka reached Back's River, and thence searched in vain on Montreal Island for the reported cairn. He then again took the mainland, and after crossing Richardson Point, for the first time, fell in with the Neit-chi-lis proper. The indications from these people not appearing those of sincere friendship, and their custom being known of killing the first stranger that comes after a death among them, an impression was made upon them by firing a gun in the air, after which, in their turn, they became friendly, and gave much further news. One of the old natives had seen books and papers scattered around the rocks, with knives, forks, and watches; another as late as the previous summer had picked up relics on the west coast of Adelaide peninsula, and pointed out the place where the ship had been sunk; others had seen the white men putting up a tent, some of their number being in a boat; some of the white men were very thin, their mouths dry, hard, and black; they had no fur clothing on; in the following spring a tent had been seen standing on the shore with a great many dead bodies inside and outside; no flesh on them. There were knives, forks, spoons, watches, many books; but the books were *not taken any notice of*: a renewed statement which alone exists as the key to the utter inability on the part of all explorers to find the Records. They were doubtless destroyed by the natives; perhaps those at Beechey Island also.

June 4, Schwatka and Gilder visited a new cairn reported to have been erected by white men near Pfeffer River. It was found to be the one erected by Captain Hall, May 12, 1869, over the bones of two of Franklin's men which he had there discovered (see Chap. VII. p. 263),

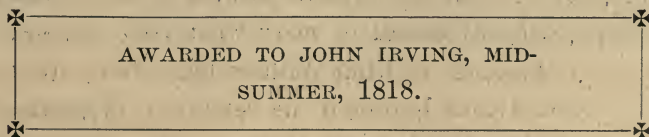
and it confirmed an impression on Schwatka's party that the white men spoken of in the tent were all officers, and that the books reported to have been found in a tin case were the more important Records of the Expedition in their charge. At the site of a camp—probably that of Crozier—after abandoning his ship off Cape Jane Franklin, were found cooking-stoves, with their kettles, besides clothing, blankets, canvas, etc., and an open grave in which was a quantity of blue cloth, some canvas, gilt buttons, and the object-glass of a telescope. On one of the stones at the foot of the grave was a solid silver medal two and a half inches in diameter with a bas-relief portrait of George IV. on the obverse, and on the reverse a laurel wreath surrounded by the words, —



and on the left a laurel wreath surrounded by,



and inclosing,



This at once identified the grave as that of Lieutenant John Irving, third officer of the "Terror;" under the head was a figured-silk pocket handkerchief remarkably preserved. The skull and a few other bones found were carefully gathered, and on the return of the Expedition sent to the grateful relations of Lieutenant Irving in Scotland, where they were buried with due honor in his native town. These were the only remains which could be sufficiently identified to warrant their removal. But by this kindly Christian act, Lieutenant Schwatka added another

national testimony as well as one of humane feeling towards the lamented navigators; Captain Hall having performed a like duty in 1869, by sending, through Mr. Brevoort, of Brooklyn, and Admiral Inglefield, R.N., remains, afterwards by a plug in a tooth identified in England as those of Lieutenant Vescomte of the "Erebus."

July 3, Schwatka's party was at Cape Felix, the most northern point of King William Land. To reach this point they had cached all their heavy stuff in order to lighten the sled as much as possible, but had found their journey to be one of exceeding fatigue, the walking bringing to them new tortures daily. They were either wading through treacherous frozen torrents or lakes, or painfully plodding in soft seal-skin boots over sharp clay stones, some of which slipped, sliding their unwary feet into crevices that would seemingly wrench them from the body. Yet they moved about ten miles a day, and made as thorough a search as was possible. Their meat diet, most of it eaten as soon as killed, brought on frequent diarrhœa, their food being ducks, geese, and an occasional reindeer. Three miles south of the cape was found a torn-down cairn containing among other things, pieces of an ornamented china teacup, and cans of preserved potatoes; indications that the spot had been a permanent camping-place from the ships, and in charge of an officer. Two miles back from the coast was another well-built cairn or pillar, seven feet high, which had been built on a prominent hill overlooking both coasts. This Lieutenant Schwatka took carefully down without meeting with any record or mark whatever. Regretting that the only one left standing on King William Land, built by the hands of white men, should thus be found, he rebuilt it, depositing in it a record of the work done by his party to date. After a thorough examination of the locality, it was plain that Sir John Franklin had not been buried in that vicinity.

July 7, the southward march was taken up from Cape Felix, and a cairn very like the last was met with, in the first course of stones of which was a piece of paper with a carefully drawn hand on it, the index finger pointing in a southerly direction; any writing upon it, if ever made, had disappeared, nor could any other relics be found. It was judged that these last two cairns had been built by the Franklin

Expedition for some scientific purpose only. Its scientific records, so long desired, especially those doubtless made here, near the Magnetic Pole, were not to be seen.

After erecting a monument, July 13, over the grave of Lieutenant Irving, and burying a copy of the Record left here by McClintock, Schwatka's party continued their coast journey, finding at different



THE MARCH SOUTHWARD.

points, tenting-places both of white men and natives, and another cairn which had been torn down, but nothing left within. At some distance from an empty grave was a skull which had evidently been dragged there by wild beasts. Near by were traces of native tenting-places; and here Gilder in his narrative remarks that, "wherever they found graves they always found evidences that the natives had encamped in the neighborhood like vultures." This, with many other like statements, was confirmatory of the records made by Captain Hall in 1869.

From this point the party went on to Erebus Bay, on the south side of which was found the wreck of a ship's boat, pieces of cloth, canvas,

iron, and human bones. The prow and stern post of the boat were in good condition, and its clinkered boards measuring twenty-eight feet six inches to where they were broken off, showed it to have been a very large boat. Portions of four skeletons were found and buried.

Here, by the breaking up of the ice and the melting of the snow, it became evident that sledging was over for the season; it would now be necessary to carry everything on the back, or upon the dogs. After a very tedious journey, Terror Bay was reached August 3, and Schwatka and Gilder were there left alone until September 1, their natives having returned to the coast to bring up some supplies with the empty sled. The two left in camp obtained a plentiful supply of reindeer. They searched the coast as far west as Cape Crozier, but the tent-place spoken of by the natives could not be found, though its site was reached; it was afterward learned that it was so close to the water that now all traces of it had disappeared.

September 19, a permanent camp was by necessity formed for early wintering, and was made near Gladman Point on a narrow point of Simpson's Strait. Reindeer were seen in immense herds. Too-loo-ah in one day killed seven in ten minutes, kissing his rifle for its dutiful obedience. On the 30th, twenty-six were killed. But by October 14, no more were seen.

The worst march of the whole journey began December 10; it became a continued struggle for life. The provision of fish which the party took from Back River, salmon, and a species of herring, soon ran out, and reindeer were so scarce that hunters were often absent several days before getting a shot at one. Farther south where they were more plentiful, but the travellers had to defend themselves from the wolves, and several times the hunters barely escaped being devoured. The reindeer flesh was now too lean to afford good nourishment, and had to be eaten, moreover, not only raw, but when frozen so stiff that it had to be sawed into small bits and thawed in the mouth; and of lard and tallow they had only enough to light their igloos. More than half the dogs died on the route.

Snow-storms often kept the party in camp several days; one of them lasting thirteen. The average temperature of the month of December



COLD WEATHER.

was — 50° F., and the minimum reading — 69°. The mean for January was — 53°; the minimum observed January 3, — 71°. The mean temperature in February was — 45°; the lowest — 69°. The thermometer stood 60° under the zero point for twenty-seven several days, and for sixteen days it was below — 68°. The natives said that the winter was an unusually severe one. The thermometer had registered on the 10th, — 62°; on the 28th, in the morning, it read, — 69°; at noon, — 64°; and at 5 P. M., — 68°; the lowest, 101° below the freezing point. It has been determined to abandon the river and strike directly for Depot Island.

But for the excellent character of the American fire-arms used, it seems impossible that this return journey could have been made. Everything, even the iron and wood, was seriously affected by such extreme cold, and when the guns were brought into the warmer temperature of the igloo only for cleaning, every particle of the gathered moisture must be removed before they again met the cold. It was also a very difficult thing to get near enough to such wary game as the reindeer, for the sound of the hunter's footsteps, though his shoe-soles were covered with fur, was carried by the wind to be heard more than a mile off. Yet, by the superiority of the guns, whenever the party came upon the reindeer, especially when travelling against a head-wind, preventing the approach of the hunter from being heard by the deer, the breech-loaders and magazine guns did their work so effectively that they could lay in a stock of meat a day or two ahead for the igloos.

The country began to swarm with wolves daily met with; they killed some of the dogs and attacked the natives. February 23, twenty attacked Too-loo-ah, who beat them off with the butt of his gun until he had killed one and made his escape, while the others were fighting over and devouring the carcass.

March 4, with light sleds and by forced marches Schwatka had got back to Depot Island, but to his amazement he here learned from Ar-mou that Captain Barry had not left with him the provisions belonging to the party, and which he had promised to leave with that faithful native; nor was there more than one ship in the bay and that was at Marble Island. A further journey was therefore necessary,

which was ended on the 21st, only when the whaler "George Mary" was boarded at midnight, Captain Gilder being the first to reach the ship.

Thus was a continuous journey safely accomplished through Arctic snows, gales, and darkness during winter months, a journey unequalled in all Arctic history. Gilder, who was ever with Schwatka at the front, though in his recital of the march through modesty he exclusively accredits others, sums up the record in terms which are worth a close citation:—

"During the year that we were absent from the verge of civilization, as the winter harbor of the whalers may be considered, we had travelled two thousand eight hundred and nineteen geographical, or three thousand two hundred and fifty-one statute miles, most of which was over unexplored territory, constituting the longest sledge journey ever made, both as to time and distance, and the only extended sledge journey ever accomplished in the Arctic, except such as have been made through countries well known and over routes almost as thoroughly established as post-roads. Our sledge journey stands conspicuous as the only one ever made through the entire course of an Arctic winter, and one regarded by the natives as exceptionally cold, as the amount of suffering encountered by those remaining at Depot Island attested, and further confirmed, as we afterward learned, by the experience of those who wintered at Wager River, where many deaths occurred, attributable to the unusual severity of the season. The party successfully withstood the lowest temperature ever experienced by white men in the field, recording one observation of -71 degrees Fahrenheit, sixteen days whose average was one hundred degrees below the freezing point, and twenty-seven which registered below -60 degrees, during most of which the party travelled. In fact, the expedition never took cold into consideration, or halted a single day on that account.

"During the entire journey, its reliance for food both for man and beast may be said to have been solely upon the resources of the country, as the expedition started with less than one month's rations, and it is the first in which the white men of an expedition voluntarily lived *exclusively* upon the same fare as its Eskimo assistants, thus showing that white men can safely adapt themselves to the climate and

life of the Eskimos, and prosecute their journeys in any season or under such circumstances as would the natives of the country themselves." [The Second Expedition of Captain Hall accorded with this last-named fact, except in the matter of his partial dependence on the whalers. — J. E. N.]

"The Expedition was the first to make a summer search over the route of the lost crews of the 'Erebus' and 'Terror,' and while so doing buried the remains of every member of that fated party above ground, so that no longer the bleached bones of those unfortunate explorers whiten the coasts of King William Land and Adelaide Peninsula as an eternal rebuke to civilization, but all have, for the time being at least, received decent and respectful interment."

"The most important direct result of the labors of the Expedition will undoubtedly be considered the establishing the loss of the Franklin records at the boat place in Starvation Cove; and as ever since Dr. Rae's expedition of 1854, which ascertained the fate of the party, the recovery of the Records has been the main object of subsequent exploring in this direction, the history of the Franklin Expedition may now be considered as closed. As ascertaining the fate of the party was not so gratifying as would have been their rescue or the relief of any number thereof, so is it in establishing the fate of the record of their labors. Next in importance to their recovery must be considered the knowledge of their irrecoverable loss. . . . The excellent management of the Commander, Lieutenant Schwatka, secured his party from many of the usual misfortunes of those in the field and deprived the Expedition of the sensational character it might have assumed in other hands. Every contingency was calculated upon and provided for beforehand."—"Schwatka's Search, Sledging in the Arctic in quest of Franklin Records." Charles Scribner's Sons, 1881.

THE RETURN TO THE UNITED STATES.

It was gratifying to all the friends of the daring explorers, to greet them safe, and in fair health on their return to the comforts of home, September 22, 1880. It is still more pleasing to find on the records of

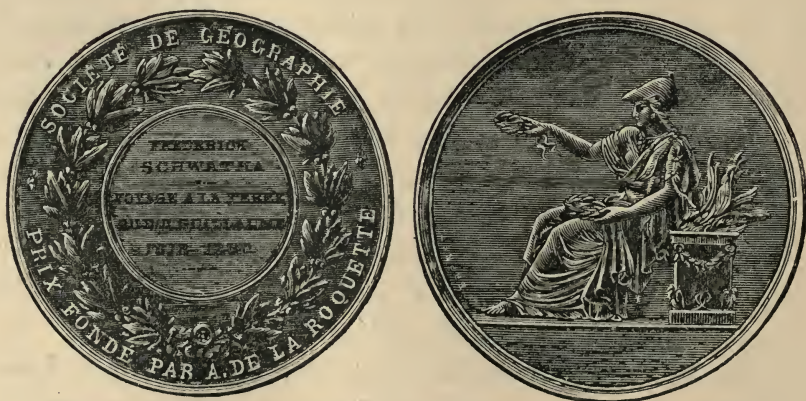
American Arctic Explorations, the history of such an Expedition, an addition to the labors of previous explorers all the more valuable as demonstrating what can be effected even amidst the tempests of the heavens and the ice-covered and desolate lands under foot, by foresight, executive ability, and undaunted iron will. The journey of Lieutenant Schwatka and his companions stands the counterpart on land with the drift of the ice-floe party conducted by Tyson from the "Polaris," unexampled in history. The *Société de Géographie* of Paris awarded to Lieutenant Schwatka one of their gold medals given to explorers. The *Comptes Rendus* of the Society for the first general session, April 20, 1883, furnish the opening address of M. de Lesseps, who referred to the fact that it was the fifty-fourth year in which the Society had awarded its highest honors, more than half of which had been decreed to Frenchmen, among whom he was proud of having place.

On the presentation of the Report from the Prize Commission on the journey of Lieutenant Schwatka to King William Land, the Commission expressed their regret through Count Louis de Turenne, that Mr. Morton, U. S. Minister, had been prevented from being present to receive this Medal, but were pleased that one of the Legation represented him. M. de Turenne further said: "Our Commission has thoroughly examined the merits and the geographical relations of Lieutenant Schwatka's journey, and you will permit me to draw from it its moral bearing. England and the United States, as every one knows, have had some earnest disputes, but immediately on the appearance of the probable disaster of the 'Erebus' and the 'Terror,' the United States exhibited the noblest activity, and made the grandest sacrifice of men and money to succor the Expedition, whose chief had once fought against them. The journey of Mr. Schwatka has been the epilogue of the series of general *croisades* made by the United States to recover the remains of the great Franklin. The Geographical Society is happy to have it in its power to crown the scientific results of an enterprise inspired by such noble sentiments."

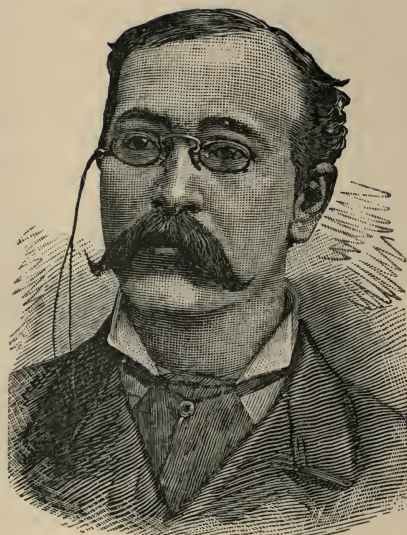
Addressing the representative of the U. S. Legation, M. de Lesseps said: "Be pleased to forward this medal to your courageous countryman, with the expression of our esteem for him and his companions. We

hope also that the Gordon Bennetts, the Lorillards, and the other Mecænases of science in the United States will accept the acknowledgments addressed to them by our prize commission, and cordially concurred in by all their associates." The beautiful gold medal, which is the counterpart of the Roquette Medal awarded to Captain Hall, has been received by the State Department at Washington, and forwarded by the War Department to Lieutenant Schwatka. It may be noted in this connection that the *Société de Géographie*, the oldest of geographical societies, has thus shown its appreciation of each American Arctic discoverer, — Kane, Hayes, Hall, and Schwatka.

By an Act of Congress approved August 7, 1882, Lieutenant Schwatka's leave-of-absence pay was raised to that of full pay during the period of his expedition, March 5, 1878, to October 1, 1880, and mileage was allowed him from his post in Dakota Territory to New York, where he took command of the Expedition, and for his return at its close from New York City to Vancouver Barracks, Washington Territory. This action of the Congress of the United States was a recognition of his meritorious conduct of the exploration. As it was a private enterprise, no official report was required, or has been made to the War Department. Lieutenant Schwatka is, at the date of this writing, reporting to the Government further explorations recently made by him on the Yukon River, Alaska.



MEDAL AWARDED TO SCHWATKA BY THE SOCIÉTÉ DE GÉOGRAPHIE.



LIEUTENANT G. W. DELONG, U.S.N.

Entered the Naval Academy as midshipman, Oct. 1, 1861; graduated, Sept. 24, 1865; promoted to be Ensign, Dec. 1, 1866; to be Master, May 12, 1868; to be Lieutenant, May 26, 1869; to be Lieutenant-Commander, Nov. 1, 1867; commanded the steam-launch "Juniata" in search of Captain Hall, 1873; commanded the "Jeannette," 1879-1881.

CHAPTER X.

LIEUTENANT DELONG'S EXPEDITION TOWARD THE POLE, 1879-1881.

THE EXPEDITION DELONG'S OWN PROMPTING. — MR. BENNETT UNDERTAKES IT. — SELECTION OF THE ROUTE. — THEORIES. — DELONG'S PLAN. — THE "JEANNETTE" COMMISSIONED. — REPORT OF THE BOARD OF INSPECTION AT MARE ISLAND. — OFFICERS AND CREW. — SAILING FROM SAN FRANCISCO. — ARRIVAL AT ST. MICHAEL'S. — REPORTS OF NORDENSKIÖLD. — PASSING THE STRAITS. — ATTEMPTS TO REACH WRANGELL AND HERALD ISLANDS. — FROZEN IN THE PACK SEPTEMBER 6. — CHIPPEAU ATTEMPTS THE CROSSING TO HERALD ISLAND. — THE "JEANNETTE" DRIFTS NORTHWEST PAST WRANGELL LAND. — PUMPING BEGUN. — LIEUTENANT DANENHOWER DISABLED. — THE RETURN OF THE SUN. — EXPERIMENT OF THE WINDMILL PUMP. — DELONG ABANDONS THE THEORY OF THE CURRENTS. — SCIENTIFIC OBSERVATIONS KEPT UP. — THE FROZEN SUMMER. — AURORAL PHENOMENA. — CONTINUED DRIFT NORTHWEST. — DISCOVERY OF JEANNETTE AND HENRIETTA ISLANDS. — THE "JEANNETTE" CRUSHED. — LANDING ON THE FLOE. — DISCOVERY OF BENNETT ISLAND; DESCRIPTION OF IT BY DR. AMBLER. — THE THREE BOATS. — THEIR SEPARATION. — THE WHALEBOAT PARTY LAND ON THE LENA DELTA. — THE FIRST CUTTER UNDER DELONG. — SUFFERINGS. — DELONG'S LAST ENTRIES. — DANENHOWER'S SEARCH. — MELVILLE'S SEARCH. — THE DEAD TEN FOUND. — THEIR BURIAL. — RETURN OF LIEUTENANT DANENHOWER. — SEARCH BEGUN BY LIEUTENANT HARBER. — ENGINEER MELVILLE'S RETURN. — APPROPRIATION TO BRING THE BODIES HOME. — THEIR EXPECTED ARRIVAL.

EXPEDITION TO THE POLE BY THE WAY OF BERING STRAIT BY
LIEUTENANT G. W. DELONG, U. S. N., 1879-81.

THE chief avowed object of this Expedition was to reach the Pole. It was the first organized attempt to solve the problem by this route, the design of M. Lambert to fit out an Expedition through the Strait having been defeated by his premature fall in the Franco-German war.

From the authentic data furnished in the "Voyage of the 'Jeannette,'"* recently issued under the editorship of Mrs. DeLong, it appears that this Expedition was of Lieutenant DeLong's own prompting. Shortly after his return from the "Juniata's" cruise on the Greenland coast in search of Captain Hall's party of 1873, he had solicited Mr. Henry Grinnell, of New York, to fit out another Arctic Expedition, but was referred by him to Mr. J. G. Bennett as the man to undertake it; Mr. Grinnell pleading his age and his having done his full share in Arctic Exploration. Mr. Bennett favorably entertained the idea on its first presentation, but the matter rested until November, 1876, when the determination was formed to secure a suitable vessel and start for the North Pole the following summer.

No proper American ship being found, DeLong went to England on a two months' leave of absence from the Navy Department, and, after a vigilant but unsuccessful search in the northern ports from which whaling vessels were sent out, decided that the "Pandora," which, as has been already stated in this volume, had made two Arctic voyages under Captain Allen Young, R. N., was the most available ship. After receiving information of Mr. Bennett's purchase of this vessel, DeLong again went to England on a second leave of absence from naval duty in the United States. He superintended the fitting out of the "Pandora" in the ship-yard at Deptford, and when she was finally ready for sea, shipped her crew at Cowes. After crossing to Havre, where he completed his equipment of charts, books, and instruments, he sailed for San Francisco by way of the Horn, July 15, 1878. Lieutenant J. W. Danenhower, who had been on duty in the Mediterranean on the

* "The voyage of the 'Jeannette'; the ship and ice journals of G. W. DeLong, Lieutenant Commander U. S. N., and Commander of the Polar Expedition, 1879-81; edited by his wife, Emma DeLong, 2 vols., 8vo.: Houghton, Mifflin & Co., Riverside Press, Boston."

In preparing the following Narrative the chief reliance has been upon the volumes just named, the proof-sheets being courteously loaned in advance; the reports of the Honorable Secretaries of the Navy, Thompson and Chandler, including those of Engineer Melville and Lieutenant Danenhower, the Report of the Naval Court of Inquiry for March 2, 1883, including the testimony of Seamen Noros, Nindemann, and Bartlett, and the Narrative of the Expedition by R. L. Newcomb, its naturalist, have also been consulted.

U. S. S. "Vandalia," had joined him as Executive Officer for the cruise. The voyage to San Francisco was one of one hundred and sixty-five days, during which the ship anchored three times within the Straits of Magellan, but no one set foot on shore until December 27, when she anchored at the Mare Island Navy Yard.

THE ROUTE.

In regard to this, DeLong had written to Mr. Bennett, January 25: "There are three ways for us to send the Expedition; Smith's Sound, Bering Strait, and the east coast of Greenland. Of the three, I am in favor of Bering Strait, though something can be said in behalf of the east coast of Greenland. Professor Nordenskiöld has received some information from our Hydrographic Office in relation to Bering Strait, and a copy of this information will be furnished us. We may be able to accomplish much by way of Bering Strait by leaving San Francisco as late as July 1, but I would like to be ready by June 1 or 10. My opinion may be changed by what you have heard from Dr. Petermann, but as you have not told me what that was, I cannot say now." What Mr. Bennett had heard from Dr. Petermann, as afterwards written to DeLong, was in substance this: "The eminent geographer felt certain that the North Pole could be reached, but not by Smith's Sound, or Baffin's Bay, nor by sledging; but by a *dash* which he thought could be made in one summer; wintering in the Arctic regions he considered a mistake if it could in any way be avoided; the Pole should be reached in three summer months or not at all."

This theoretical advice was unsound. The Bering Strait route seems to have been determined upon chiefly from a reliance on the two theories, that the Japan current opened by its warm waters a way through the strait toward the Pole, and that Wrangell Land would prove to be a vast continental tract. Dr. Petermann had often urged the idea that Wrangell Land would be found to stretch itself across the Pole, reappearing as Greenland. The "Jeannette" was to follow the coast-line of this land, and then make sledge expeditions along the ice foot. DeLong hoped to reach it the first season, and spend the winter

there in exploration, and thence go to the extreme limit of possible navigation. "If the current takes me to the west," he wrote before starting, "you will hear of me through St. Petersburg; but if it takes me eastward and northward, there is no saying what points I may reach; but I hope to come out through Smith's or Jones' Sound." He wrote, "It is our intention to attack the Polar regions by the way of Bering Straits, and if our efforts are not crowned with success, we shall have made an attempt in a new direction and examined a hitherto unknown country." In conversation with Lieutenant Danenhower, he said he had also something more definite and tangible in view than reaching the North Pole, and that was to explore Wrangell Land and the Siberian Ocean; there were rumors and traditions of Wrangell Land being inhabited or visited by natives. The prospects for reaching a high latitude depended on the continuity of the coast-line to the northward, for having land as a basis of advance was considered one of the first principles of Polar explorations.

July 17, 1879, he wrote:—

AT SEA, lat. $41^{\circ} 58' N.$, long. $136^{\circ} 0' 1''$.

"If the season is favorable to an advance northward I shall make for Kellett (or Wrangell) Land, and follow along its east coast as far as we can go.

"If everything is all right with Nordenskiöld, and I hear of it, there will be no necessity for our going to St. Lawrence Bay at all. In this case I shall push through Bering Strait at once and make for the east side of Kellett Land, following it as far as possible, and getting to as high a latitude with the ship as we can before getting into winter quarters. If our progress is uninterrupted for some distance, I shall content myself with one landing, at first on the southeast point of Wrangell or Kellett Land, where we will build a cairn and leave a record of our progress to date. If our progress is interrupted, we shall no doubt make frequent landings on Kellett Land, and build several cairns; but, generally speaking, I shall endeavor to build cairns and leave records every twenty-five nautical miles of our track."

From Ounalaska he wrote, "We go to as high a latitude as God will let us reach in two years, keeping in reserve the third year to get back; pray for my success, for my heart is set on this thing."

And, here although seemingly in hasteful anticipation of the history which this narrative is to present, the writer finds himself compelled to note, that, outside of the reports of some whaling captains and of pure theory, there appeared little ground for the belief in the extension of Wrangell Land beyond the limits assigned on the U. S. Hydrographical Chart; and that the supposed favorable influence of the Japan current on the waters of the Arctic Sea, advocated by Mr. Bent and others, was an idea equally delusive with that of an existing continental tract toward the Pole.

Mr. W. H. Dall, Assistant U. S. Coast and Geodetic Survey, in his then unpublished report to the office for the year 1880, had thus summed up an investigation of the currents of Bering Sea:—

"The Kuro Siwo, compared with the Gulf Stream, is cooler, has a much smaller volume, and is subject to serious fluctuations which appear to be due to the monsoons.

"The Kuro Siwo sends no recognizable branch northward; between the Aleutians and Kamchatka, nor from any other direction in Bering Sea. The chief current of that sea is a motion of cold water *southward*. This has a superficial stratum above it, which has, in summer when not interrupted by winds, a northerly motion of translation, but is not sufficient, either in mass, motion, or consistency of direction, to be entitled to take rank as an ocean current. The surface currents are formed by or chiefly dependent on tides, winds, river flows, the southerly motion of cold water, the distribution of floating ice, and the northerly motion of slightly warmer surface water; which are effective in about the order named.

"No warm current from Bering Sea enters Bering Strait, with the exception of water from the neighboring rivers or the adjacent sounds. This water owes its heat directly to the local action of the sun's rays. The strait is *incapable* of carrying a current of warm water of sufficient magnitude to have any marked effect on the condition of the Polar Basin just north of it.

"The currents through the strait are cool and chiefly tidal, but with a preponderating tendency northward, as before fully set forth.

"The currents in the Arctic, north of the straits, are largely *dependent on the winds*, but have tendencies in certain recognized directions. Nothing in our knowledge of them offers any hope of an easier passage toward the Pole, or, in general, northward through their agency. Nothing yet revealed in the investigation of the subject in the least tends to support the widely spread but unphilosophical notion, that in any part of the Polar Sea, we may look for large areas free from ice."

In a very interesting lecture recently delivered before the American Geographical Society of New York, Dr. Thomas Antisell, of the U. S. Patent Office, Washington, says:—

"In May and June a broad warm current is found flowing around the shores of the Liu-Kiu Islands and the Bonin Islands, which it has already reached in April, producing variable winds before the *monsoon* is established in full influence. This current is felt off the shores of Japan, and has already received its Japanese title—the Black Sea or current (Kuro Siwo)—from the remarkable dark color which its waters exhibit when looking over the ship's side,—it is a deep blue-black, and it can be thus recognized with ease as soon as it is attempted to be crossed. Cradled in the China sea, the offspring of the equatorial drift and its warm currents among the Philippine Islands, when it passes Formosa in early summer, it is already a powerful current, and begins to send off lesser currents while proceeding on its northern route. . . . But the waning power of the Kuro Siwo is indicated by the temperatures of the months of October, November, and December, in which it disappears between lat. 30° and 40°. The whole ocean is cooling down, and the influence of the Asiatic shores as refrigerators is apparent; the N. E. monsoon has set in and continues during the first, three months of the new year to bring down the condition of the surface of the Pacific to that condition of equilibrium in which no warmth is communicated from the air to the ocean. The S. W. monsoon has ceased to blow, and the Kuro Siwo as a current disappears, although its warming and equalizing diffusion continues in a mild way. . . . The North Pacific Ocean has, practically speaking, no northern outlet;

Bering Straits is but a *cul de sac*, and is no real gate of entrance into the Arctic Ocean."—Bulletin, American Geographical Society, No. II., 1883.

The objects before Captain DeLong having been thus stated, and the unfortunate expectation of success entertained by him in reliance upon the authorities first named, the thread of the narrative is resumed at San Francisco. The "Jeannette" was yet the private property of Mr. Bennett, but his own judgment fully accorded with the advice given in the outset by Lieutenant DeLong, that the ship should be placed in every respect under Naval Command, and a bill was therefore promptly introduced into Congress that the Government should accept the "Jeannette" for the purposes of a voyage of exploration. The Act authorizing this provided that Mr. Bennett might use in fitting her for her voyage any materials he might have on hand for it; might enlist the necessary crew for special service, their pay to be temporarily met from the pay of the Navy, and to be paid or refunded by him under the future orders of the Secretary of the Navy as he might issue these. The ship was to proceed on her voyage under the instructions of the Navy Department, and the men were to be subject in all respects to the Articles of War and Navy regulations and discipline. This Act, approved February 27, 1879, was supplemental to the one approved March 18, 1878, which had authorized the Secretary of the Treasury "to issue an American Register to the vessel, and the President of the United States to detail with their own consent commissioned, warrant, and petty officers not to exceed ten in number, to act as officers to said vessel during her first voyage to the Arctic Seas."

Under the authority of these Acts, Secretary Thompson on the 18th of June, 1879, gave to DeLong his instructions, which, however, left the details to the experience, discretion, and judgment of the Commander. They embraced the provision, that, on reaching Bering Strait, he should "make diligent inquiry at such points where he deemed it likely that information could be obtained concerning the fate of Professor Nordenskiöld; if he had good and sufficient reasons for believing Nordenskiöld was safe, he would proceed on his voyage; if otherwise, he would pursue such a course as would be judged necessary for his aid and relief."

Ten days later, the ship was put in commission, when the silk flag was used which had been made by Mrs. DeLong to be unfurled when taking possession of any new-found land and when the highest latitude was reached. The following account of the vessel which has made an historic record of such interest is in place: "The 'Pandora' was built at Devonport, England, and was first commissioned by Commander W. F. Ruxton, R. N., who sailed in her for the coast of Africa, on which coast she was on duty for the term of four years, — her only commission in the British Navy. Captain Sir Allen W. Young, R. N. Reserve, purchased her from the Admiralty for his first Arctic cruise in 1875, and had her rigged at Southampton as a barquentine, and fortified and prepared with all the modern equipments of an Arctic exploring ship. He made his second Arctic voyage in her as far as Peel Straits in 1876, returning to Portsmouth, England, in November of that year. Both voyages were severe tests of the strength of the ship; on the second in lat. 75° 10' N., long. 62° 7' W., he drifted five days helplessly with the pack which drove him up into Melville Bay, and from which he escaped by the change of the wind breaking up the ice, and by putting on the ship his whole steam-power. As described by DeLong in his letter to Lieutenant Danenhower, dated London, June 2, 1878, "the 'Pandora' was of four hundred and twenty tons (builders' tonnage), one hundred and forty-two feet long, twenty-five feet beam; and drew when loaded with her Arctic outfit, about thirteen feet; barque-rigged, rolling topsails and trices up her screw; steams or sails about six knots, and is a neat, tidy little ship. She had been thoroughly repaired and was put in shape, her engine force increased to two hundred horse-power, and she had a wide spread of canvass." In reply to inquiries recently made by the Naval Court of Inquiry, Sir Allen Young (November 22, 1882) deposed before W. J. Hoppin, Secretary of the U. S. Legation, London, that he had considered the "Pandora" fit for Arctic service, both as regards strength and model, basing this opinion on his actual experience in her, and on his service in the "Fox." He believed her to be far superior to the "Fox." It is known that the ship was parted with by the owner most reluctantly.

At the Navy Yard, Mare Island, California, during the month of

January, 1879, a Board of Naval Officers examined the "Jeannette," and reported in obedience to the orders of the Commandant of the Yard, Commodore E. R. Colhoun, what repairs were needed, with an estimate of their probable cost. The suggestions of the Board which was composed of Chief Engineers M. Fletcher and G. F. Kutz, Commander L. Kempff, and Naval Constructor George W. Much, were made in conference with the Commander, who forwarded a full report to Mr. Bennett, adding the result of his own careful and minute examination. As the final decision of her outfit rested with the Secretary of the Navy, Captain DeLong was ordered to Washington, where he arrived February 15, and was most cordially received by Secretary Thompson, who expressed himself as personally and officially interested in this Expedition. March 11, Commodores Easby, English, and Shock, Chiefs of the Bureaus of Construction, of Equipment, and of Steam-engineering, forwarded under the sanction of Secretary Thompson instructions to the Commandant of the Yard at Mare Island to repair and strengthen the "Jeannette," and furnish to her the supplies still needed for her Arctic cruise. The work to be done on the yacht was to be in accordance with an enclosed memorandum; the estimated cost of repairs and alterations submitted by the Board which has been named exceeded \$42,500; the outlay finally rose nearly to \$100,000.

June 26, a second Naval Board composed of Captain P. C. Johnson, Commander C. J. McDougal, Naval Constructor G. W. Much, and Chief Engineers G. F. Kutz and Edward Farmer, reported to Commodore Colhoun, in reply to his order of the 6th to state whether the repairs and alterations recommended by the Board of Survey had been made, whether any other work not embraced in it but considered necessary had been done, and whether, in their opinion, the ship had been so far as practicable repaired and placed in condition for service in the Arctic Ocean. The Report was an affirmative reply to the points named by the Commodore as regards the repairs and necessary alterations. It embraced, however, the statement that, "while she had been repaired and placed in condition for Arctic service, so far as practicable, it was not possible in the opinion of the Board to make her particularly adapted for an extended Arctic cruise." The order convening the

Board, the Report said, "did not require any expression of opinion further than what was thus expressed in its Report." "As it was a private enterprise, and the ship had been purchased and was satisfactory to those most interested in the enterprise, it was rather a delicate thing to express an unfavorable opinion of it in our official capacity." *

The preparation of the "Jeannette," carried forward during DeLong's absence in Washington under the supervision of Lieutenant C. W. Chipp and Master Danenhower was completed after the return of the Lieutenant by his own immediate care. Writing to Mr. Bennett, after leaving San Francisco, he said: "Finally, all work came to an end, and the ship was turned over to me. I am perfectly satisfied with her. She is everything I want for the expedition, but a little small for all I want to carry in her. We must remember, however, we are making her do the work of an expedition that has heretofore generally required two ships. We have every appliance for all kinds of scientific experiments. Our outfit is simply perfect, whether for ice or navigation, astronomical work, magnetic work, gravity experiments, or collections of Natural History. We have a good crew, good food, and a good ship; and I think we have the right kind of stuff to dare all that man can do." †

* By the Act of Congress, however, and the Secretary's instructions, it would seem she was under full Naval law.

† Before the court of inquiry convened at the Navy Department, October 5, 1882, the deposition of Naval Constructor Much, made at San Francisco, showed that in the opinion of the Board the model or form of the "Jeannette" was not adapted for ice navigation, Constructor Much agreeing with Lieutenant Danenhower's testimony that in his opinion she was seaworthy but not fit for extended exploration, being an old vessel of poor model, constructed of materials, of sizes, and a general arrangement, more suitable for a yacht than for an ordinary built merchant-vessel of the same displacement. The repairs made in England were for the most part superficial, of poor workmanship and inferior material, so much so that it was found necessary to remove and replace with better material. The Commandant and all other officers of the yard did all that could be done under the circumstances to render the "Jeannette" efficient for the contemplated expedition, and whatever opinions may have existed in reference to her fitness, she proved herself able for over twelve months to withstand the heavy flocs and crushing ice of the Arctic Ocean, and in all probability no vessel, however strongly built, could withstand such a continued strain.

In this last judgment, the finding of the Naval Court of Inquiry named above accords. It recites that "although the weight of the evidence shows that she was not especially adapt-

DEPARTURE OF THE "JEANNETTE."

July 8, 1879, Captain DeLong reported to the Secretary of the Navy that the ship being in all respects ready for sea, would sail at 3 P. M. of that day, and would proceed with all despatch to the Island of Ounaslaska, and thence to St. Paul's and to St. Michael's, Alaska, at which last point it was hoped that some tidings would be had of Professor Nordenskiöld and his party. Failing in this, St. Lawrence Bay in Siberia would be visited in further quest; should nothing there be learned, the course would be through Bering Straits, and thence skirt the coast of Siberia as far westward as navigation would permit.

The complement of officers and crew embraced the following names: George W. DeLong, Lieutenant U. S. Navy, commanding; Charles W. Chipp, Lieutenant U. S. Navy, executive officer; John W. Danenhower, master, U. S. Navy; George W. Melville, passed assistant engineer, U. S. Navy; Dr. James M. Ambler, passed assistant surgeon U. S. Navy; William M. Dunbar, seaman, for special service as ice pilot; Jerome J. Collins, entered on the books as seaman, but for special service as meteorologist; Raymond L. Newcomb, also entered on the books as seaman, for special service as naturalist and taxidermist; Walter Lee, machinist; James H. Bartlett, first-class fireman; George W. Boyd, second-class fireman; John Cole, boatswain; Alfred Sweetman, carpenter; with Seamen W. F. C. Nindemann; Louis P. Noros; H. W. Leach; Henry Wilson; C. A. Gortz; P. E. Johnson; Edward Star; Henry D. Warren; H. H. Kaack; A. G. Kuehne; F. E. Manson; H. H. Ericksen; Adolph

ed in strength or model for navigation in the Arctic region, the fact that an experienced Arctic explorer had voluntarily made two cruises in her to the Arctic Seas sustains the judgment and care shown in her selection when last purchased. The condition of the 'Jeannette' on her departure from the port of San Francisco was good and satisfactory to her officers and crew, except that she was unavoidably deeply loaded, a defect which corrected itself by the consumption of coal, provisions, and stores." It is unhappily well known that the provisions were reduced in stock not only by consumption but, as not unusual in like cases, by condemnation of some of them on their first arrival from New York. In regard to her fitness for the work before her Lieutenant Danenhower's judgment expressed to the Board was decidedly adverse. The preceding statements seem necessary for an impartial judgment and for demonstrating in connection with the history which follows, that no vessel can be built which can outlive a conflict with the ice of the North Polar Sea.

Dressler; Charles Tong Sing; Ah Sing; Ah Sam; and coal heavers, Walter Sharvell, Nelse Iverson, and John Lauterbach.

The full list then numbered thirty-two persons. Of the officers, Lieutenant Chipp will be remembered as having been DeLong's associate on the cruise for Hall in the little "Juniata," July, 1873; he had volunteered in close friendship with DeLong for this Expedition, arriving, after his detachment from the "Ashuelot" in China, at San Fran-



LIEUTENANT CHARLES W. CHIPP, U.S.N.

Appointed Acting Midshipman, July 23, 1863; graduated from the Naval Academy, June 2, 1868; promoted to be Ensign, April 9, 1869; Master, July 12, 1870; Lieutenant, Dec. 2, 1872.

cisco in the spring of 1879. Master Danenhower, as has been said, had come round the Horn in this ship; passed assistant engineer Melville had been DeLong's comrade on the U.S.S. "Lancaster" in the South Atlantic, and was the engineer of the U.S.S. "Tigress" sent out for the relief of Captain Hall; passed assistant surgeon, J. M. Ambler, of Virginia, whose medical record in the service was very high, filled the important post of surgeon. The ice-pilot, Dunbar, of New London, Conn., had been master of whale ships in and north of Bering Strait.

The crew had been selected with great care, partly from the east and partly from the Pacific coast. William Nindemann had distinguished

himself on the voyage of the "Polaris" by his faithful execution of the volunteered but dangerous duty of planting the ice anchors on Providence berg, saving the vessel during the stormy night of November 21, 1871. Officers and crew were volunteers.

Steaming out of the harbor of San Francisco, the "Jeannette" was escorted by the Governor of California, by a number of yachts of the San Francisco Yacht Club, and by steam launches loaded down with citizens. Every ship which was passed dipped her colors, and opposite Fort Point its garrison saluted the "Jeannette" with twenty-one guns. At 3.30 of the 9th, Point Reyes light was lost sight of. At eleven it was foggy, misty, and rainy, with a choppy sea that broke aboard over either rail. The ship was loaded very deep, eleven feet nine inches forward.

August 3 she had reached Ounalaska Island, having groped her way into the harbor through thick fogs and terrible tides, running between one hundred or more islands, very incorrectly laid down on the charts; some of them not at all. DeLong wrote that getting observations was out of the question, for when he could see the sea, he could not see the horizon, and that his experience in getting through the passes into Bering sea was far beyond all previous crooked navigation he had witnessed. To the Secretary of the Navy he wrote that from all the intelligence received from the northward, the previous winter had been an exceptionally mild one. The revenue cutter "Rush" had just come south from her cruise to the northward, twenty miles north and east of east Cape Siberia, without having encountered any ice. This seemed to be news of a most encouraging nature.

DeLong deplored the necessity of having loaded his ship so deeply at San Francisco, since this had made the progress so slow under head winds and swell, that it was doubtful whether he could profit by this open water in the Arctic sea in the effort to gain a high latitude that season. He would proceed to St. Michael's, and if nothing there could be heard of Nordenskiöld, from thence to St. Lawrence Bay.

At St. Michael's the ship filled in further stores, purchased forty dogs, and engaged two Indians, Aneguin and Alexai, as hunters and dog drivers. No news had been received, nor had the schooner "Fanny A.

Hyde" arrived from San Francisco with coal and extra stores; by this the commander was seriously embarrassed. He must wait for coal, and must still delay by crossing to St. Lawrence Bay; meanwhile the fine season was "slipping away, when he might reach Kellett Land and push on to the northward." The schooner "F. A. Hyde" came in on the 18th and followed the "Jeannette" to the Bay which was reached on the 25th. Engineer Melville, from that port, wrote: "It



LIEUTENANT JOHN W. DANENHOWER, U. S. N.

Entered the service, Sept. 25, 1866; promoted to be Ensign, July 13, 1871; to be Master, Sept. 27, 1873; Lieutenant, Aug. 2, 1879.

was very fortunate for the ship that she had the schooner to carry our extra coal and stores over here, for on the way we were caught in a terrible gale of wind, and, owing to the condition of the ship, and deeply laden as we were, the sea had a clean sweep over us. It stove in our forward parts, carried away the bridge, caved the bulkheads, and in fact just drowned us out. Had we the other stuff on board, we must have foundered, or else got it overboard in time. We leave here for East Cape to-day, having taken on board all our stores, and we are in even much worse sea condition than we were before; but we think that maybe, when we get into the ice where the wind can't raise a sea, we

will be all right." The commander wrote that as he got out clear of land into Bering sea, he found the water so shallow that a very ugly sea was raised in a short time, and that he had experienced a gear of thirty hours during which he had to lay the ship to and ride it out.

Before leaving the Bay a native chief told of his having been, three months before, on board a steamer smaller than the "Jeannette," and found on her two officers who spoke English, and a third who spoke the Tchuktchi language like a native. The name of this officer, as far as could be heard from this native chief, was *Horpish*, the true name being as DeLong justly believed, that of Lieutenant Nordquist, spoken of in Nordenskiöld's voyage of the "Vega," as having learned to speak the Tchuktchi tongue. DeLong came to the conclusion that it was Nordenskiöld's steamer which had been seen, but as nothing had been made sure, and his last authentic advices from the Secretary had been that the Professor, when last heard from, was at Cape Serdze Kamen, he thought it his duty to go there, although the distance was one hundred and thirty miles; on the 27th, therefore, he towed the transport schooner out of the harbor, and stood on a north north-east course toward Bering Strait.

On the 29th he attempted to land at the Cape, lat. 67° 12' N., but found so much ice moving about as to make this impossible. On the 30th, Lieutenant Chipp, accompanied by Dunbar, Collins, and the native Alexai, landed and learned through Alexai from an old squaw, that the steamer had wintered on the east of Koliutchin Bay; and on the 31st the same party, together with Master Danenhower, at last made sure by a landing on the bay that the "Vega" had certainly wintered there and gone south. Swedish, Danish, and Russian buttons found in the hut on shore, and traded for by Chipp for his vest buttons as cash, were proofs enough of the "Vega's" visit, as no other ship had been in that part of the world with Swedish, Danish, and Russian officers on board. Papers were also found written in Swedish and having on them the word Stockholm.

At 2 P.M. DeLong held divine service, all hearts being thankful that at last they knew that Nordenskiöld was safe, and the "Jeannette" might proceed on her journey to Wrangell Land. In his journal he

wrote, "If Nordenskiöld had left any kind of a written paper at St. Lawrence Bay or at Cape Serdze Kamen, he could have saved much uncertainty," but he apologizes for the lack of any record. The delay of the "Jeannette" seemed, however, fatal to her purpose of reaching Wrangell Land for a winter security.

IN THE PACK.

On the sixth following day, the ship was beginning to be closed off by the remorseless pack. That day his journal entry was: "I am hoping and praying to get the ship into Herald Island to make winter quarters. As far as the eye can range is ice, and not only does it look as if it never had broken up, but it also looks as if it never would. Yesterday, I hoped that to-day would make an opening for us into the land; to-day I hope that to-morrow will do it. I suppose a gale of wind would break up the pack, but the pack might break us up. This morning shows some pools of thin ice and water, but as they are disconnected and we cannot jump the ship over obstructions; they are of no use yet to us." On the 8th, still undaunted, he again wrote, "I consider it an exceptional state of the ice that we are having just now, and count upon the September gales to break up the pack, and perhaps open leads to Herald Island, I want the ship to be in condition to move without delay. Besides, I am told that in the latter part of September and early part of October there is experienced in these latitudes quite an Indian summer, and I shall not begin to expect wintering in the pack until this Indian summer is given a chance to liberate us." The liberation, as is too well known, was not to come. Yet DeLong at this very point did, it would seem, the best that could be effected. In the judgment of the Naval Court of Inquiry, "Either he had to return to some port to the southward, and pass the winter there in idleness, thus sacrificing all chances of pushing his researches to the northward until the following summer, or else he must endeavor to force the vessel through to Wrangell Island, then erroneously supposed to be a large continent, to winter there, and prosecute his explorations by sledges. The chances of accomplishing this latter alternative were sufficiently

good at the time to justify him in choosing it; and, indeed had he done otherwise, he might fairly have been thought wanting in the high qualities necessary for an explorer." He had long before expressed the opinion that putting a ship into the pack was the last thing to do.

On the day from which the journal entry above has been cited, at 1 P.M. the fog lifted and there was seen a chance to make a little headway toward Herald Island; the "Jeannette" worked hard to force her



GEORGE W. MELVILLE, CHIEF ENGINEER, U. S. N.

Appointed Assistant Engineer, July 29, 1861; Passed-Assistant Engineer, Dec. 16, 1862; Chief Engineer, Jan. 30, 1865.

way wherever a crack or narrow opening showed itself between the two floes, even where the ice of the floes was from ten to fifteen feet thick. By judicious ramming and backing and ramming again, the ship's head, by the help of the steam-winch, was shoved into weak places where the helm could not be turned, but within three hours, she was brought finally up again to solid floes; thick fog settled down and the ice-anchors were planted. This day, snow-goggles were served out to all hands with orders to wear them. The position of the "Jeannette" was established by observation to be $71^{\circ} 35' \text{ N.}$, $175^{\circ} 5' 48'' \text{ W.}$ She already heeled five degrees to starboard.

September 13, at 8 A.M. Lieutenant Chipp and Engineer Melville, Ice-Pilot Dunbar, and the native Alexai started out on the floe with a sled and eight dogs, to attempt a landing on Herald Island, toward some harbor within which DeLong's lingering hopes still looked; he also thought it possible that drift-wood might be found on the island to help out the winter's fuel. But the party returned without having met with any success for either of these objects; no place could be seen offering any protection for a ship, nor any driftwood. Alexai shot a seal and brought it back in the boat, and on the second day following, DeLong with Melville, Chipp, and Dunbar, shot two bears, after their escape of some miles from the traps. The bill of fare was as yet sufficiently comfortable.

But at the close of the month the "Jeannette's" position was far from being such, as she was still held between the floes as in a vise, continuously heeled over five degrees, and drifting with the pack. In the four days from the 21st to the 24th the drift was twenty miles to the north, one degree west. Herald Island had entirely disappeared; but by a change in the drift to the southwest, by October 3 the island reappeared in plain sight, bearing south-southeast true. On the 14th land was again seen in the same quarter and now very distinctly; and on the 21st another distinct view was had, the land appearing as one large island with three peaks. Seen again on the 28th, the "Jeannette" being in $71^{\circ} 57' N.$, $177^{\circ} 51' W.$, DeLong believed it to be the north side of Wrangell Land, but he no longer thought it a continent, it was "either one large island or an archipelago."

The night of the 28th was beautiful, "the heavens were cloudless, the moon very nearly full and shining brightly, and every star twinkling; the air perfectly calm, and not a sound to break the spell. The ship and her surroundings made a perfect picture. Standing out in bold relief against the blue sky, every rope and spar with a thick coat of snow and frost, — she was simply a beautiful spectacle. The long lines of wire reaching to the tripod and observatory, round frosted lumps here and there where a dog lay asleep; sleds standing on end against the steam-cutter to make a foreground for the ship; surrounded with a bank (rail high) of snow and ice; and in every direction as far

as the eye could reach, a confused, irregular ice-field, — would have made a picture seldom seen.”

On the following day a curious but not unusual point in Arctic history occurred among the dogs of which the Expedition had a good supply. One of a team which was out to hunt some walruses killed the day previous, deserted, by an escape from his harness. The other dogs attempted to chase him, and the native Alexai quickly said: “Bom bye other dogs him plenty whip.” Truly enough, for after the return of the team, Bingo being found at a safe distance, had been chewed up so badly by the others that he died in a few minutes. The Arctic dog will not bear laziness on the part of a fellow-dog in harness.

November 6, the first startling crack occurred in the floe, compelling the removal from it of the meteorological instruments to the ship; but she did not move an inch, and, on the 7th, the opening again closed. The 11th was a day of great anxiety; at 6 A.M. the ice was again in motion, and the ship groaned and creaked at every pressure, threatening at each to break adrift. “Masses from fifteen to twenty-five feet in height when up-ended, slid along at various angles of elevation and jam, and between and among them were large masses of *débris* like a marble-yard adrift.” A break was made in the floe across the ship’s bow, and a projecting floe berg ploughed its way like a wedge to break the floe ahead.” At 4 P.M. the movement was renewed. Every movable thing was again brought on board, the dogs being confined by a fence.

Like trying experiences were repeated again and again, until on the 24th by the action of the southwest wind the “Jeannette” was once more for a little season afloat. Lieutenant Danenhower says, that, on the 24th of November the half cradle on which the port side had rested could be seen about a thousand yards distant, and this immense lead was open, but of very limited length. The appearance of the ice could be likened to an immense cake as it comes from the oven, broken and cracked on the surface. “A few mornings later the drift ice came down on us under the starboard bow, and wedged the ship off her cradle, and she went adrift in the gale. This was about 8 A.M. She drifted all day until 7 P.M., when she brought up in some young

ice, and was frozen in solid again. It was dark, in the long night, and there was no chance of working the pack had it been good judgment to do so. We reckoned that she had drifted at least forty miles with the ice in her immediate vicinity. Previous to this time the ship had stood the pressure in the most remarkable manner. On one occasion, I stood on the deck-house above a sharp tongue of ice that pressed the port side just abaft the forechains, and in the wake of the immense



DR. J. M. AMBLER, U. S. N.

Entered the service as Assistant Surgeon, April 1, 1874; Passed-Assistant Surgeon,
June, 15, 1877.

truss that had been strengthened at Mare Island, by the urgent advice of Commodore William H. Shock. The fate of the "Jeannette" was then delicately balanced, and when I saw the immense tongue break and harmlessly underrun the ship I gave heartfelt thanks to Shock's good judgment. She would groan from stem to stern; the cabin-doors were often jammed so that we could not get out in case of an emergency, and the heavy truss was imbedded three quarters of an inch into the ceiling. The safety of the ship at that time was due entirely to the *truss*." Recording the experiences which have been just named, De Long says: "This steady strain on one's mind is fearful. Seemingly

we are not secure for a moment, and yet we can take no measures for our security. A crisis may occur at any moment, and we can do nothing but be thankful in the morning that it has not come during the night, and at night that it has not come since morning. Living over a powder-mill, waiting for an explosion, would be a similar mode of existence. . . . Sleeping with all my clothes on, and starting up anxiously at every snap or crack in the ice outside, or the ship's frame inside, most effectually prevents my getting a proper kind or amount of rest, and yet I do not see anything else in store for me for some time to come."

Christmas Day was the dreariest day he ever experienced, passed certainly in the dreariest part of the world; yet it was something to have had as yet no serious mishap. The crew came aft to wish the officers a merry day, and made music for them in the deck-house. The ship's bells at midnight of the 31st called all hands together to give three cheers on the quarter-deck for the New Year, and for the "Jeannette."

Lieutenant Danenhower was now unfortunately placed on the sick-list, being in danger of losing the sight of his left eye. Surgeon Ambler found it necessary that he should remain in total darkness in his room. DeLong was very much distressed at the news, as the Lieutenant's efforts had kept off the moping for many an hour, and he feared the effect of such confinement on the mind. The sick man did not improve during the month of January.

Forced anxieties for the condition of the ship were intensified on the 15th, 19th, and 22d. On the 15th the floe was found to have cracked and opened about twenty feet from the starboard side, the crack rounding the bow and running in one direction in the prolongation of the stem, and in another across the stern. At 3 P.M. it had widened to eight feet in width, another fissure appearing on the port side about one hundred feet distant. On the 19th there was a loud noise as of the cracking of the ship's frame, and at 7.45 A.M. the wind suddenly shifted from north to northwest, the ice began to move, and the ship evidently received tremendous pressure amid the groaning and grinding floes. The ice moving to the eastward, piled up large masses of the floe under the stem, *breaking the fore-foot*.

PUMPING BEGUN JANUARY 19, 1880.

To add to the anxieties of the ship's company two streams of water an inch in diameter then began to flow through the filling which had been put in below the berth deck, and the water soon stood eighteen inches deep in the fore-peak and thirty-six inches in the fore-hold, while in the fire-room it was over the floor-plates on the starboard side. The deck pumps were at once rigged and manned, and by the indomitable energy of Melville, as credited to him in DeLong's journal, after five hours' severe labor, the steam pump was set to work. The temperature of the fire-room was -29° , outside of it, it had run down to -44° , one of the mercurial thermometers freezing solid. The barometer had ranged from 29.62° to 30° . An attempt to cut out the ice under the bow by digging away some of the pieces which had been piled up, served only to bring the water over the ice beneath, which by freezing effectually stopped work. No injury could be detected outside, but the correct judgment was already formed that the ship's fore-foot had been broken off or twisted, starting the starboard strakes. On the 22d, at midnight, the water still stood nineteen inches deep at the fire-room bilge, and at the step of the fore-mast. The barometer rose from 30.05° to 30.28° ; the thermometer was -28° at midnight, -37° at noon.

This day, at the urgent advice of the Surgeon, an operation was performed on Lieutenant Danenhower's left eye, and borne with heroic endurance by the patient. To this expression DeLong, while referring to the possible necessity of another operation, adds: "My anxieties are beginning to crowd on me. A disabled and leaking ship, a seriously sick officer, and an uneasy and terrible pack, with the constantly diminishing coal-pile, and at a distance of two hundred miles from the nearest Siberian settlement—these are enough to think of for a life-time." It was some relief to all this that by the 27th it was found that the Sewell pump was making two thousand two hundred and fifty gallons per hour, holding the water in check. The leak had been diminished from the 23d over one-third. Two of the crew, Nindemann and Sweetman, were working all day from 9 A. M. to 11 P. M. in stuffing plaster-of-paris and

ashes in the spaces between frames through holes cut in the ceiling above the berth deck on each side; their work soon diminished the leak four hundred and fifty gallons per hour.

The night of the Arctic regions had given to each one of the ship's company the usual bleached appearance, but with the exception of the sick officer, the company were still in fair health. Their spirits had been raised on the 26th by the reappearance of the sun. All hands turned out to enjoy the pleasing novelty of seeing genuine sun-shadows for the first time in seventy-one days, and, although the glare at first made the eye blink like an owl, DeLong could not get enough of the pleasant sight. The light was specially cheering, for when the sun was on the meridian to the southward, the full moon was on the meridian at the northern horizon so that for twenty-four hours there was sunlight or full-moonlight all the time.

The month of February still found at work the steam-pump which was to be in very successful use till May. It made forty strokes a minute, pumping out two thousand two hundred and fifty gallons an hour.

On the 1st and 2d of the month two large bears were killed, the stomach of the larger one containing nothing but several small stones resembling pieces of slate. Impelled by hunger, he had tried to get on board ship, attracted by the meat of the first bear hung up to a girt-line.

On the 6th of the month, in measuring the thickness of the floe, it was found that another floe had shoved in under it, which gave DeLong reason to think that this had been the case all around the ship, and that the control of the leak had been due to the underlying floes of ice uniting by freezing and lowering the water-head in the vicinity of the leak. To this record DeLong's journal added the sadly prophetic words, "If this be the case, we shall have our hands full at the breaking up."

By the 15th the pumping had been so perfected as to hold the water in check without resorting to pumps to be worked by the main boiler, and this had very encouragingly reduced the consumption of coal to four hundred pounds per day only, in place of the one thousand or one thousand two hundred which would have been consumed by the main boiler furnaces. But the troubles seemed to thicken. The water forced

its way through the filling between the frames to the berth-deck, making it wet, sloppy, and unhealthful. Sweetman partially succeeded in stopping this by putting in more filling, building a little bulkhead under the berths, and boring a hole into the deck to let the water off into the fore-peak. On the 19th DeLong wrote: "All our hoped-for explorations, and perhaps discoveries this coming summer, seem slipping away from us, and we have nothing ahead but taking a leaking ship to the United States. At the best I do not like to contemplate any further accident, although in our position almost anything might happen to us." On the 23d, Washington's birthday was celebrated by dressing the ship with American ensigns at the mastheads and flagstaff, and the Union Jack forward; the 22d had been Sunday. Beyond flag-hoisting there was no holiday, for there was too much work to be done.

March 1, Lieutenant Danenhower had the sixth operation on his eye performed, with the Surgeon's statement that others would probably be necessary at short intervals; he still kept his health and spirits. The ship had again drifted northwest, her position being determined by Chipp on the 6th, to be lat. $72^{\circ} 12' N.$, long. $175^{\circ} 30' W.$; by the 13th the drift was again thirty-three miles north and $55^{\circ} W.$, and by the 27th, fourteen miles further to north, and $63^{\circ} W.$

DeLong thought that he was extremely fortunate in lying so long without serious disturbance. The upper part of the propeller frame had been uncovered by digging away the ice under the stern, and no sign of any damage was apparent there. The ice also had been dug away under the bows to a point on the stem where the draught would be six and one half feet, at which depth diligent search could detect no injury to the bow, and DeLong came more than ever to the correct opinion that the ship's fore-foot was the seat of the damage. Unhappily at midnight, after the digging, the pressure of the water underneath was too much for the thin layer of remaining ice, and holes were broken through sufficient to flood the large pit under the bow. He says, "If we only could get down to the leak and tinker at it, we might do something. If we could have open water enough, we might build a cofferdam and get it under the bow, or if we could get the ship into a harbor and beach her, we would be all right; but these things seem impos-

sible." At the same time great confused masses were piled up thirty and forty feet in height, and Sharvell, one of the crew, reported that he saw, about five miles northwest of the ship, ice piled up as high as the masthead; he thought the destruction of the ship by its reaching that mountain of ice, or by that mountain of ice reaching her, merely a question of time. On the 24th and 25th eight times as much water as before had come into the fire-room; no greater amount seemed to come in forward, but it was necessary to keep the steam-cutter's engine going nearly all the time aft. It was impossible to discover what could have gone under the ship to affect the leak in this way.

An immense walrus had been shot, thirty of the dogs and four of the men being unable to drag him in over the rough ice until cut in two. Nindemann estimated his weight at two thousand eight hundred pounds; a prize for dog food, which Alexai had secured. Strangely enough the observations of the 30th placed the "Jeannette" almost identically in the same position with that occupied four months before.

The look-out for steaming, except for a few days, was already beginning to be almost hopeless, as with all the economy which had been brought into use, sixty-three tons of coal was the utmost which could be expected to be on hand by May 1. Thirty-five tons of this kept for the possibility of a second winter in the pack, would leave but twenty-eight for steaming, pumping, and cooking during the summer, yet the consumption of coal in pumping the ship had been a necessity, for hand-pumping alone would have probably placed many on the sick list. But a happy thought came into DeLong's mind; pumping might be done by constructing a windmill. Consulting Melville as to making the necessary machinery on board ship, the engineer thought out all the details and commenced making drawings, and on the 17th mounted the windmill as an experiment on the ice without sails. Three days afterwards it was attached to the shifted bilge-pump and set to work; its sails, made at first of sheeting, having too little surface, were improved by substituting for these, sheet-tin fans, utilized from the empty coffee and sugar tins. The winds, however, were light.

By the 25th of April, a meridian altitude showed for the lat. 72° 52' N., a progress northward; as the water also was deepening, DeLong

began again to hope that there was a chance of a speedy breaking up of the ice by the wind, or by the yet to be discovered current; but on the 26th the sounding suddenly dropped thirteen and one half fathoms less, the drift was northwest. He was anxious to get on, hoping that 73° was a barrier which once passed, they could go forward with some credit to the name the ship bore. On the last day of the month the total drift as shown by observation, amounted to eighty-four and two-tenth miles *to and fro*; "made good in a straight line forty-six miles N., 50° W." The zigzag course of the "Jeannette" was beginning to mark out the whole strange line shown on the Circumpolar Map in the Pocket of this volume. The drift to the northwest was extremely disheartening. DeLong had constantly hoped to be set northeast, but according to the experience of all in the Arctic,—the English relief ships for Franklin, the whalers, and, very recently, the observations of Lieutenant Ray, U.S. Signal Service Corps, stationed near Point Barrow, the ice masses of the north do not remain open.

In May, the Commander's journal has the following striking passage: "Whatever *theory* may have been advanced as to currents in this part of the Arctic Ocean, I think our drift is demonstrating that they are the local creation of the wind for the time being. As our drift in general resulting direction has been northwest since our first besetment, so is it a fact that the greater amount of wind has been from the southeast, our short and irregular side-drift east and west and occasionally back to south being due to correspondingly short and irregular winds from northwest or east. A glance at my wind-record will make that clear. . . . *Theory* as to our movement is long since *abandoned* in my mind, giving way to facts based on experience. Theory may assert how we ought to drift, but our position from day to day shows how we do drift, and I accept the situation." Yet a lingering hope for the best prompted him after a short drift east, to write: "We have evidently gotten under way again, though from some reason we are prevented from going to the westward, perhaps by a heavy barrier of ice, against which our field is slowly grinding along. I have had an idea that our drift of late may be explained in some such manner; our field turning on a pivot as it advances, and eventually bringing us to its highest.

point will throw us off to the eastward. The northwesting having been accomplished we are now doing our northing, and then going to northeast, will eventually be carried along east, by the current which sets east through the Archipelago north of the American Continent. Time will show the fallacy or the truth of this supposition; but meanwhile it affords a subject for contemplation." But soon after this DeLong again wrote: "A drift of five and a half miles to south 38° E. The irony of fate! How long, O Lord? How long? As to there being any warm current reaching to a high latitude, we have found none. I am inclined to agree with Lieutenant Weyprecht, when he says, 'The Gulf Stream does not regulate the limits of the ice; but the ice, set in motion by winds, regulates the limits of the warmer Gulf Stream water; and I pronounce a thermometric gateway to the pole a *delusion* and a snare.' Of course, if any warm current came through Bering Strait it would be the Kuro Siwo, and our sea temperatures have indicated no such fact. . . If we only had something to do, that would be advancing the interests of the Expedition, there would be some excitement in the life. Hourly meteorological observations are taken, it is true, and the ship's position daily obtained by sights, and then we have to stop. Magnetic observations of any value are impossible, because of our ever-changing positions. Rough observations for the variations and dip are obtained, but they will serve only for convenient approximate reference, and will have no exact scientific importance. The constant change of position prevents any correct pendulum experiments from being made. No astronomical observations, except determinations of latitude and longitude, with sextant and artificial horizon, have been possible, because the erection of the observatory and the mounting of the instruments on the ice, in our situation, would have exposed them to loss should a break-up occur. Soundings are made daily, and specimens of the bottom obtained and preserved for future reference. Temperatures of the surface water are recorded every day at the sounding-hole, and that exhausts hydrography for us. At this temperature it is not practicable to add water-cups and sea-thermometers to our lead-line, for it ices up so fast, and breaks so readily when frozen, that we might lose cups and thermometers. Natu-

ral History is well looked out for. Any animal or bird that comes near the ship does so at his peril."

"The important point of the drift," says Lieutenant Danenhower, "is in the fact that the ship traversed an immense area of ocean, at times gyrating in almost perfect circles, her course and the observations of her officers proving that land does not exist in that area, and establishing many facts of value as regards the depth and character of the ocean bed and its temperatures, animal life, etc. It is matter of lasting regret that the two thousand observations of Lieutenant Chipp, an accomplished electrician, especially upon the disturbances of the galvanometer during auroras, as recommended to be made by the Smithsonian Institution, as well as the meteorological observations of Mr. Collins, perished with the lamented young officers in the wreck of their boat on the Siberian shore."

May 27, the windmill-pump by its connection with the boiler tube-pump was now rendering valuable service, reflecting great credit on Melville, Sweetman, and Lee.

Before the month closed, the log was headed "one hundred and ninety miles northwest of Herald Island." The total drift was one hundred miles, eighty-two miles to N. 38° W. The average temperature had been °18.46, lowest, —°8.5, the highest 35°.

SUMMER IN THE PACK.

The ninth chapter of Mrs. DeLong's voyage of the "Jeannette" bears the sad title, "A Frozen Summer, June–August, 1880." The hopes of release for the ship from her icy cradle seemed well grounded by the thermometer reading 37°, with a fall of rain on the first day of June. Fires were discontinued in the cabin and berth-deck, and the record could be made that there was a gradual resuming of ship-shape proportions to be ready for a start northward and eastward, or northward and westward, whichever the ice and the winds would permit; and DeLong had been again hoping strongly day after day for some indication of a coming liberation. The decks were rapidly clearing, and he thought he was surely approaching the time when nothing would remain but to

hang the rudder and make sail for some satisfactory result of the cruise. But, from the first day of the month to the longest of the year, fogs, snows, and gales were almost the daily log entry. The drift, contrary to all expectation, had been generally to the southeast. For more than nine months the ship had been driven here and there at the will of the winds. On the 30th her position was $72^{\circ} 19' 41''$ N., $178^{\circ} 27' 30''$ E. fifty miles south, 9° E. of her place on the first. She was heeling 4° to starboard (3° all winter), and her doubling on that side was about four inches above the water. From the crow's nest it could be seen that she was in the centre of an ice-island, a lane of water in some places a quarter of a mile wide, surrounding her at the distance of about a mile. Much effort had been made to liberate the screw without success. The drift on that day was only one mile.

The journal of July 8 makes special reference to the thickness of the floes around and underneath the "Jeannette." It recites the facts, that "in September, 1879, after ramming the ship through forty miles of leads, she was pushed into a crevice between two heavy floes subsequently found to be thirteen feet thick; a depth caused by the overriding and uniting of one floe with another by regelation under pressure. When she was pushed out into open water November following, she was afloat, but the next day, iced in." By January 17, 1880, the ice had a thickness of four feet around the vessel, later measurements being rendered impossible by the confused massing which took place two days afterward. As the leak had now almost subsided more firmly and correctly, DeLong believed that he was buoyed up by a floe extending down and under the keel. "Let us hope," he wrote, "that one of these days the mass will break up and let us down to our bearings." How sad these bearings were to prove! The forefoot was irretrievably wrenched. The ship must sink immediately on the "breaking up."

During the remainder of the month of July, and throughout August, the monotonous record of the previous months of routine duty on board ship, and of drift with no release from the ice, remained with scarcely a variation from day to day. August 17, DeLong writes: "Our glorious summer is passing away; it is painful beyond expression to go

round the ice in the morning and see no change since the night before, and to look the last thing at night at the same thing you saw in the morning. . . . High as our temperature is (34°), foggy weather a daily occurrence, yet here we are hard and fast, with ponds here and there two or three feet deep, with an occasional hole through to the sea. Does the ice never find an outlet? It has no regular set in any direction north, south, east, or west, as far as I can judge, but slowly surges in obedience to wind pressure, and grinds back again to an equilibrium when the pressure ceases. Are there no tides in this ocean? . . . Full moon or new moon, last quarter or first quarter, the ice is as immovable as a rock. . . . It is hard to believe that an impenetrable barrier exists clear up to the Pole, and yet as far as we have gone, we have not seen one speck of land north of Herald Island." The average drift for the month had been to the southeast.

September 1, the ship at last was on an even keel, and this had occurred very quietly and without shock; one or two large chunks of ice rose to the surface and then all was still. The ship was yet immovable, her keel and forefoot being held in the cradles. After sawing under the forefoot five or six feet, in the hope of getting once more properly afloat, it was found that more water came in, and the sawing must be arrested. The well-grounded apprehension existed that the broken stem or sprung garboards were firmly held in the ice, and that work on the ship would only tend to open the rent still more widely. With the prospect of a second winter in the pack, and with but fifty-three tons of coal, there was no desire to go back to steam pumping, from which the ship had been relieved by the use of the quarter-deck pump which was now bringing by the hand one hundred and fourteen gallons per hour. The comfort of being on an even keel was very great, but the hope of keeping the ship afloat if she should reach open water, was to all very questionable. Before the close of the month, the idea of open water was abandoned, and preparations made for a second winter in the pack. What gave the most concern and anxiety was to make it possible for a readiness to abandon the ship suddenly in case of disaster. As long as enough of the vessel should remain for shelter, it was preferable to camping on the ice; and the

lamented Commander already could "conceive no greater forlorn hope than to attempt to reach Siberia over the ice with a winter's cold sapping one's life at every step."

There was no apprehension of the lack of food, several bears being again secured. With the exception of Lieutenant Danenhower's case, and that of the temporary sickness of two of the crew, the general health of the ship's company remained good, the quick restoration of the sick showing a freedom from all taint of scurvy. Lieutenant Danenhower had been under severe treatment for nine months, but for his eyes only.

PLEASANT OBSERVATIONS.

In some relief doubtless to the monotonous journal entries of these months, the "Voyage of the 'Jeannette'" contains several specially graphic pictures, the first of which here cited is from DeLong's pen, and the second from Lieutenant Chipp's.

"October 16. I have heretofore made several attempts to describe the beauty of these Arctic winter nights, but have found my powers too feeble to do the subject justice. They must be seen to be appreciated. It is so hard to make a descriptive picture of moon, stars, ice, and ship, and unluckily photography cannot come into play in this temperature to supply a real picture. Imagine a moon nearly full, a cloudless sky, brilliant stars, a pure white waste of snow-covered ice, which seems firm and crisp under your feet, a ship standing out in bold relief, every rope and thread plainly visible, and enormously enlarged by accumulations of fluffy and down-like frost feathers; and you have a crude picture of the scene. But to fill in and properly understand the situation, one must experience the majestic and awful silence which generally prevails on these occasions, and causes one to feel how trifling and insignificant he is in comparison with such grand works in nature. The brightness is wonderful. The reflection of moonlight from bright ice-spots makes brilliant effects, and should a stray piece of tin be near you, it seems to have the light of a dazzling gem. A window in the deck-house looks like a calcium light when the moonlight strikes it at the proper angle, and makes the feeble light from an oil-

lamp within, seem ridiculous when the angle is changed. Standing one hundred yards away from the ship one has a scene of the grandest, wildest, and most awful beauty."

On the following midnight, he says, "the scene was almost worth the imprisonment that accompanied it. One half the sky was covered by cumulo-stratus clouds, moving from north to south, and at that moment, extending from the zenith to the southern horizon, obscuring the moon and the stars (north of the zenith the sky was clear, except a streak of cirro-stratus above a small bank of rising cumulo-stratus). Immediately following the first-named cumulo-stratus clouds, and near the zenith, was a faint auroral arch extending from east to west, with its ends slightly curving to the southward, and hidden by the clouds near the horizon. As the clouds nearly uncovered the east end, a mass of bright-green light shot up, and spread like a fan over 10° of arc; and just as the east end was completely uncovered, the mass changed into brilliant green spiral curtains, terminating a bright white arch through the zenith to west. After perhaps a minute, the clouds being well clear of the arch, the light paled and lost colors, and the arch-ends straggled back to northwest and northeast, the centre being at the zenith. The moon then became entirely uncovered, the floe seemed lighted as in midday, and but few faint streaks of arches remained thin and almost indeterminate."

At the later winter date of December 27, at 3 A. M., Lieutenant Chipp noted "a bright auroral curtain about 10° above the horizon from east-southeast to northwest, generally white, but occasionally showing a green shade, and rarely a brownish-red color, which disappeared as soon as seen. Above this curtain the sky was of a deep blue black, through which the stars shone brilliantly as they did also through the deepest part of the curtain. Above the deep blue-black were irregular spirals and streaks of white light, in continuous motion appearing and disappearing rapidly. From east to west, through the zenith, was an irregular arch formed of detached streaks of brownish-red light, among which white light would suddenly appear, and as suddenly vanish. This arch was 5° broad. Stars shone with apparently undiminished brilliancy through the deepest color."

It must be already a matter of much surprise to the reader, awakening the deepest interest and sympathy in these few pages of "The Journal," to mark how these disappointed explorers, conscious of lost hopes of usefulness, and of almost lost hope of freedom from ice imprisonment, kept up their good cheer. Christmas day and New Year's day had witnessed the repetition of celebrations as if at home; and the amusements necessary for health even in Arctic solitude and its monotony were renewed. There never, perhaps, was equal proof of the eternal springing up of hope than here, even after the severest reverses. There is abundant confirmation of the declaration written by the late Admiral Davis in his reference to the *Polaris* party — ("Narrative of the North Polar Expedition of 1871") — that a trust in Divine Providence never deserts the breast of a true seaman. De Long does not seem to have omitted a single reading of Divine Service to his officers on shipboard, and doubtless gave himself entirely into the hands of the Omnipotent, expressing frequently his thankfulness for what health, comfort, and hope remained — and this to the last hour. January 1, 1881, he wrote: "I begin the new year by turning over a new leaf in this book, and I hope in God we are turning over a new leaf in our book of luck. I am thankful for our preservation among many perils." But winter went on, spring came, that is to say as named in the calendar; but no spring for the "*Jeannette*;" no release; no assurance of it, nor even from destruction of the ship at any hour.

THE SPRING OF 1881.

The first break of the monotony came in May. On the 16th, Ice-Master Dunbar called Chipp to look at *Land*, clearly enough an island, bearing, by DeLong's quickly made observations, S. 78° 45' (magnetic), N. 83° 15' W. true — the first land to greet the eye since March 24, 1880, fourteen months before. What it had to do in the economy of nature standing desolate among the icy wastes was not the question; it might be the spot to which the ducks and geese had been flying, and if the ship could get some of them for a change, what a treat! "Fourteen months without anything to look at but ice and sky, and twenty

months drifting in the pack will make a little mass of volcanic rock like *our island* as pleasing to the eye as an oasis in the desert." On the following day observations placed the ship in lat. $76^{\circ} 43' 38''$, long., E. $161^{\circ} 42' 30''$; the rocky cliffs of the island appeared with a snow-covered slope, the highest and further corner seeming to be a volcano top. The temperature noted was maximum $11^{\circ} 5'$, minimum $5^{\circ} 5'$. The "Jeannette" drifted past on the north side; the ice was so broken, and the pack running so rapidly that DeLong did not think it prudent to make an attempt to land. Sketches were made from the crow's nest.

May 24, the pleasing sight was renewed, more land was ahead, and the ice very slack, with many large lanes of water varying in length from an eighth of a mile to three miles, and in width from twenty to one hundred feet. The lanes were very tantalizing; they seemed to be within a radius of five miles, but the islands were from thirty to forty miles off, and from that five miles radius to them, the ice was as close and compact as ever. On the 31st, estimating the distance to be but fifteen or twenty miles, Engineer Melville, in company with Dunbar and Nindemann, and three other seamen, set out from the ship with a fifteen-dog team to visit this second island. They landed on it June 3, and took possession for the United States, naming it Henrietta — the name of a sister of Mr. Bennett; a cairn was built and a record placed within it, and a limited examination made of twelve hours. It was found to be a desolate rock, surrounded by a snow cap which feeds several glaciers on its east face. Within the inaccessible cliffs, nesting dovebies were the only signs of life. To reach the land, the party left their boat and supplies, and carrying only one day's provisions and their instruments went through the frightful ice mass at the risk of life, dragging the dogs, which through fear, refused to follow their human leaders. Mr. Dunbar returned badly affected by snow-blindness; Chipp, Newcomb, Dunbar, and Alexai were now on the sick list, on which Surgeon Ambler had kept DeLong also for several days, in consequence of a severe wound in his head received incidentally from a fan of the windmill. A general order was made out giving the names and positions of the two islands, Jeannette Island, lat. $76^{\circ} 47'$, long., E. $158^{\circ} 56'$, approximate; Henrietta Island, lat. $77^{\circ} 8'$, long., E. $157^{\circ} 43'$. DeLong wrote:

"Thank God, we have at last landed upon a newly-discovered part of this earth, and a perilous journey (Melville's) has been accomplished without disaster. It was a great risk, but it has resulted in some advantage."

THE CRUSH AT LAST, JUNE 13, 1881.

These discoveries were, however, to be the only fruits of the long weary months; sad forecasts of a ship to be crushed within the coming week. On the very day last named, the ice around her was broken down in immense masses, the whole pack being alive, and had the ship been within one of the fast-closing leads she would have been ground to powder. Embedded in a small island of ice, she was as yet protected from the direct crushing on her sides, but felt a continual hammering and thumping of the ice under her bottom.

On the 12th, Sunday, at midnight, in a few moments' time, she was set free by the split of the floe on a line with her keel, and suddenly righting, started all hands from their beds to the deck. By 9 A. M. the ice had commenced coming in on her side; a heavy floe was hauled ahead into a hole where it was supposed the ice coming together would impinge on itself instead of on the ship. The pressure was very heavy, and gave forth a hissing, crunching sound, and at 3.40 P. M. the ice was reported coming through the starboard coal bunkers. The ship was heeling more than 20° to starboard. At four o'clock she was lying perfectly quiet, but her bows were thrown up so high in the air, that looking down through the water the injury to her forefoot made Jan. 19, 1880, could be seen. Melville went on the floe to take her photograph, but on returning to the ship heard the order to prepare to leave the vessel by getting out the chronometers, rifles, ammunition, and other articles to the floe. Lieutenant Chipp was quite sick in bed, but was notified; Captain DeLong "was everywhere, seeing that all things went on smoothly and quietly, without the least haste or consternation among the crew; he came about the deck in the same manner as though we were in no danger whatever, and tried to have the officers and men feel as collected as he was." There was ample time for all persons to get out their personal effects, but to get a barrel of lime-juice, so necessary to prevent scurvy

on their march, Seaman Starr waded into the forward store-room at the risk of his life.

When the order was given for all hands to leave the ship at about eleven at night, her water-ways had been broken in, the iron work around the smoke-pipe buckled up, the rivets sheared off, and the smoke-stack left supported only by the guys. Three boats were lowered, the first and the second cutter, and the first whale-boat; and the ship's party of thirty-three made their camp on the floe in six tents, but within an hour were compelled to move still further from its edge by the breaking up of the floe in their camp.

Lieutenant Danenhower, in his interesting "Narrative of the *Jeanette*," from which much that follows is derived, says that soon after the watch was set and the order given to turn in, when they were just getting into their sleeping-bags, the ice cracked immediately under the Captain's tent, and Erickson would have gone into the water, but for the Mackintosh blanket in which he with others was lying, the weight of his companions on each side keeping the middle of it from falling through. After about two hours' work the stores and three boats were shifted to another floe piece, and the party again turned in, about four hundred yards from where the ship was going down in lat. $77^{\circ} 14' 57''$ N., long. $154^{\circ} 58' 45''$ E.

At 4 A.M., June 13, the cry of the watch was heard, "There she goes; hurry up and look, the last sight you will have of the old '*Jeanette*'!" While the ice had held together, it had held her broken timbers. When it opened — with her colors flying at the masthead — she sank in thirty-eight fathoms of water, stripping her yards upwards as she passed through the floe. At 3 A.M., her smoke-pipe top was nearly awash; the main topmast first fell by the board to starboard, then the fore topmast, and last of all the mainmast. The ship before sinking had heeled to starboard about 30° , and the entire starboard side of the spar deck was submerged, the rail being under water, and the water line reached to the hatch-coamings before the ship had been abandoned. The next morning, a visit to the place where she was last seen showed nothing more than a signal chest and a cabin chair with some smaller articles afloat.

THE RETREAT SOUTHWARD.

June 16, DeLong called all hands and read an order that the start southward would begin at 6 P.M. on the following day, the march to be in the night to avoid snow-blindness from the intense light; dinner to be at midnight, supper at 6 A.M., to be followed by sleep. The delay had been made on the recommendation of Surgeon Ambler that the sick and disabled might recruit before commencing their toilsome journey. Several of the ship's company were suffering from lead poison, induced by the action of the acid on the inner coating of the tins containing canned goods, a fact which reminds one of the condition of the cans found on Beechey Island by the first searching parties of the Franklin Relief Expeditions, the empty cans there showing by their bulged forms the effect of the fermentation of the fruit within. In the case of the "Jeannette," the poisoning from tomato cans had caused severe cramps; eight of the party being on the sick list.

Although at the fearful distance of three hundred and fifty miles from the Siberian coast, with the prospect of the most toilsome of marches over hummocks, and all the uncertainties of a landing and the subsequent journeyings which must be made of over fifteen hundred miles to Yakoutsk, or six thousand five hundred to St. Petersburg, officers and men accepted their new conditions in the same spirit of fortitude and hope. Their dependence was upon the amount of provisions and clothing saved, their boats, sleds, teams, and their own energy. They had nearly five thousand pounds of American pemmican in canisters of forty-five pounds weight each, about fifteen hundred pounds of other canned provisions, and fifteen hundred pounds of bread; with a full supply of ammunition for game, two dingys beside the three boats named, and in all, nine sleds.

Before breaking camp, DeLong prepared and carefully sewed up in a piece of black rubber placed within an empty boat breaker, a record reciting the facts of the abandonment of the "Jeannette" after the discovery of the two islands named, and the crushing of the ship, and of the start southward in the hope, with God's blessing, to reach the new Siberian Islands, and from thence to make a way by boats for the coasts

of Siberia. The closing paragraphs of the record spoke of the ice as of the same character with that encountered by Captain Nares, of the prevalence of the southeast winds, and of there being no currents not caused by the prevailing wind at the time. The month was a cold one, and he was inclined to think it would be a cold summer.

The order of march was at first to advance the first cutter to a point established by Ice-Pilot Dunbar, and then take forward one by one the other two boats and provision sleds. Each officer and man was provided with a harness, fashioned to go across the chest and one shoulder, and attached to the sled by a lanyard; the snow was knee-deep, the road very rough and full of fissures over which the boats were jumped or ferried, while the sleds were dragged over large hummocks. The first mile and a half was made in three hours, an unpromising forecast. Lieutenant Chipp, who had urged his being put on duty, fainted, and Lee, the machinist, and Lauterbach, had been suffering agony with cramps. A halt of two days was necessary to repair damages, when a progress was again made of about a mile or a mile and a half a day over the rough and moving floe. The men had to go over the road thirteen times—seven times with loads and six times empty-handed—thus making twenty-six miles to make an advance of only two. Twenty-one men had to do most of the work for the thirty-three. At the end of the first week the Captain found by observation, that the drift had more than neutralized the way covered by the advance; that, in fact, he had lost twenty-seven miles by the drift to the northwest in excess of the march to the South! This, of course, was kept a profound secret. In the latter part of June the snow all melted and travelling was better, but the men had to wade through pools of thaw-water and their feet were constantly wet. The number of times passed over the ground was reduced to seven, and the advance facilitated.

DISCOVERY OF BENNETT ISLAND.

July 11, a heavy water sky was seen to the south and southeast, and the experienced ice-pilot expressed his opinion that such clouds did not hang over ice. Climbing to the top of a hummock twenty feet

above the water level, DeLong says that he saw a large expanse of water and unmistakable land; and thought that he might be at the margin of the ice-field leading him to open water and thence to the Siberian coast. At 6.30 A.M., he camped on an ice island about five hundred yards in diameter with no encouraging outlook, the southwest horizon foggy and the land and water disappearing. The utmost distance made toward the island was but two miles, and from this time the progress was very slow, but it was a steady ice drift to the northeast, and on the 28th a landing was made on the new discovery. The island was so steep that a footing was had with difficulty, yet at 7 P.M. everybody was on shore, the silk flag was unfurled, and possession taken in the name of the President of the United States. The south cape was named Cape Emma, lat. $76^{\circ} 38''$ N., long. $148^{\circ} 20''$ E.

The surgeon, Dr. Ambler, says of Bennett Island: "It is certainly of volcanic origin. It is composed of trap-rock, a species of feldspathic rock, igneous rock with silica caught up in it in masses; trap-rock with globules of silica; trap-rock containing globules, which rock being broken shows the globules of the darker color sticking in the matrix, while the portion of the mass knocked off will show a complete mould or bed. The globules are about the size of a pea, receive a bright polish from the finger, and are soft enough to be cut with a knife; silica, very light stone; tufa, I think, of a light brown color, spongy in appearance, as if blown up by gases; lava of different colors, varying from a yellowish brown to a dark green; clays almost the color of bricks; *débris* from the sides of the cliff being disintegrated portions of this red, seemingly baked clay.

"The face of the cliff, Cape Emma, is in six terraces of igneous rock, separated by other strata imposed, of the red clay stuff which contains most of the silica. The amethyst was found in a matrix of quartz imbedded in the trap rock. The stalagmite and stalactite were found upon breaking open a mass of trap-rock found lying on the beach, and could easily be removed by the finger. The stratification is horizontal; fossils seen. There is also a white stone with very much the appearance of gypsum. There are two varieties, one occurring in tabular masses, with glistening sides when held in the light, and the other of a

dull, opaque white, and in rounded masses which show the action of water. Both varieties can be cut with a knife, and form an opaque white powder, which effervesces upon applying nitric and acetic acids."

The ship's company now encamped for several days, needing rest and change of diet. Their first surfeit on the numerous birds readily knocked down brought some sickness, compelling a return to pemmican. Dunbar and the two Indians explored the east side of the island, finding there several grassy valleys; Lieutenant Chipp and Mr. Collins explored the south and west sides; a box of geological specimens was obtained and brought home by Lieutenant Danenhower. Dr. Ambler obtained amethysts, opals, and petrifications; tidal observations were made, the greatest rise and fall noted being about three feet. The party left the island August 6, and made fair progress until the 20th, when, after drifting along the north coast of Thadeoffsky Island (or Thaddeus Island), they were imprisoned nearly ten days, after which they found themselves in navigable water, and rounded the south point of the island.

THE BOATS.

The three boats and their several occupants were, the first cutter, holding Captain DeLong, Surgeon Ambler, Mr. Collins, and eleven of the crew, including Ah Sam, the cook, and the Indian, Alexai; the second cutter, with Lieutenant Chipp, Ice-Pilot Dunbar, and six of the crew; and the whale-boat, Engineer Melville commanding, Lieutenant Danenhower (invalid), and eight of the crew, including the Chinese steward, and the Indian, Aneguin. The dimensions of the second cutter were much less than those of either of the other two boats, her extreme length being but sixteen feet three inches, while that of the first cutter was twenty feet four inches, and of the whale-boat, twenty-five feet four inches. Chipp's cutter was also a very bad sea-boat, and had not sufficient carrying capacity for a full allowance of provisions. The first cutter had the greatest carrying capacity of the three, was fitted with mast and one shifting lug sail, pulled six oars, and was an excellent sea-boat. The depth of the first cutter and of the whale-

boat from top of gunwale to top of keel was two feet two inches ; that of the second cutter, two feet six inches. The whale-boat was one of the very best fastened of boats ; each was clinker-built, copper-fastened, inside lining.

The draught of the boats when loaded (from twenty-four to twenty-eight inches), was caused by the heavy oak keel pieces put upon them to strengthen them for hauling over the ice. Fitted with weather cloths, at the date of September 11, their free boards were about twelve inches above water. The whale-boat had one prismatic compass, and a pocket chronometer ; the second cutter had the same, and a Bowditch Navigator ; and the first cutter a box and a pocket chronometer, a comparing watch, and a pair of binoculars. Lieutenant Chipp also had a pair.

FIRST LANDING.—NEW SIBERIAN ISLANDS.

On the 10th, the land of the Asiatic coast was in sight, estimated to be twenty miles westward ; and on the 11th, a landing was made and parties sent out hunting. An old deserted hut was found, and human footprints made by a civilized boot. Lieutenant Chipp and some of his sailors visited Melville's camp, and reported that they had had a very rough experience.

September 12, the three boats left Semenovski Island on which the party had camped, at about 8 A.M., and remained in company till noon, dining together. A gale was commencing from the north-east, which by 7 P.M. forced all hands in the whale-boat to be pumping or baling out water. The course was south-southwest, true. Captain DeLong was about five hundred yards distant from Melville, and Chipp seven hundred from DeLong. The gale increasing, both of these last were lost sight of by the whale-boat ; the first cutter, destined to land her party and make the sad experience of their intense suffering to death by cold and starvation ; the second cutter to leave no record, but the blank to be filled by the reasonable supposition of her being swamped by the sea ; and the whale-boat to be saved only by the successful use of a drag or sea-anchor, and the incessant baling by almost exhausted men.



BUDINGTON'S BOATS PASSING SORFALIK, JUNE, 1872.

▲ picture of Arctic boat-journeying in Summer.

THE WHALE-BOAT.

The course of the party in this boat will be first traced. Engineer Melville was in command. He relied, also, on the professional ability of Lieutenant Danenhower, still on the sick list. The pocket prismatic compass, useful on shore where it could be levelled and the needle come to rest, was now unavailable. They steered by the sun or the moon. Lieutenant Danenhower carried the watch and chart, and could shape the course of the boat by the bearings of the sun at this equinoctial period. September 15, one of the eastern mouths of the Lena was entered, and, by the assistance of a Tungus pilot, the party pushed up the river, and on the 26th reached a small village, in which lived a Siberian exile, Kopelloff, who proved very useful in opening the way to intercourse by teaching the Lieutenant Russian phrases. They were detained at this place waiting for the growth of the ice for sledding, and while another Russian exile, Koosmah Gerrymahoff, with the chief of the village, went forward to Bulun to inform the Russian authorities of their arrival.

On the 17th of October, Danenhower began his search with a dog team, to explore the coasts for the missing boats, but was unable, from the condition of the ice, to proceed far in any direction, and returned without results. The wide river, or rather bay, which separated Gemovialocke from the main land, was sometimes covered with young ice, too thick for the passage of boats, and too thin for the passage of sledges, and at times was filled with floating masses of old ice; while their ignorance of the language left them unable to express their wants, or to discover the resources of the vicinity in respect to reindeer or dog teams.

On the 29th the two messengers returned, bringing the news that on their way back they had met natives with deer-sleds, who had Nindemann and Noros, of DeLong's party, conducting them to Bulun. The two seamen had written a note, stating that the captain's party were starving, and needed immediate assistance. Koosmah communicated this note to Engineer Melville, who immediately started with a native and dog team, to find the men, learn the position of the Cap-

tain's party, and carry food to them. Danenhower was ordered to take charge of the party, and get them as soon as possible to Bulun. November 1, the Bulun commandant brought to him a good supply of bread, deer-meat, and tea, and a document addressed by Noros and Nindemann to the American minister at St. Petersburg; this the Lieutenant forwarded by Seaman Bartlett to Melville, and as soon as possible himself started forward, overtaking Melville at the first deer station. He received from him orders to go forward to Yakutsk, which he reached December 17, 1881, having travelled by deer-sled nine hundred versts (six hundred miles) to Verchoiansk, and thence, by means of deer, oxen, and horses, the remaining nine hundred and sixty versts.

At Yakutsk Melville received the first dispatch from the Secretary of the Navy, ordering him to send the sick and frozen to a milder climate; Lieutenant Danenhower's party went forward, therefore, to Irkutsk. Here, being advised by the Russian oculist that his right eye would be well in a few days, he telegraphed to the Department, through the American Legation at St. Petersburg, asking permission to hire a steamer, and search for Lieutenant Chipp's party during the spring and summer; also for two line officers to assist. He received a reply through the Legation that two officers would be sent. The entire party of men of which he had charge volunteered to remain for the search, six of them being in excellent condition; February 5, however, he received further orders from the Navy Department that, owing to his condition of health, the order to remain and search for survivors of the "Jeannette" was revoked. The oculist allowing him to start on the 13th of March, the Lieutenant went forward with his men, except Seaman Noros, whom he had been ordered by a subsequent telegram to permit to accompany Mr. J. P. Jackson, a special messenger sent out by Mr. Bennett to renew search on the Lena delta.

March 17, Lieutenant Danenhower received at Nischnendinsk, a telegram from Lieutenant G. B. Harber, U.S.N., who had been sent out by the Navy Department with Master W. H. Schuetze, and after full conference with him, turned over to him in writing, all the principal facts and details concerning the missing parties; also the chron-

ometer, sextant, and other instruments. Lieutenant Harber obtained permission from the Secretary to retain the enlisted healthy men to assist him in his search, and on the 23d Danenhower came forward to St. Petersburg which he reached May 1, having been detained on the road by a light attack of small-pox in the case of Tong Sing. With Mr. Newcomb, Cole, and the Chinese, he arrived in New York City, June 1. Cole was already mentally affected, and early became an inmate of the Government Asylum for the insane in Washington, where he still remains. The rest of the whale-boat crew, except the Indian, Aneguin, who died of small-pox in Russia, and Nindemann and Noros of Captain DeLong's party, arrived in the United States previous to the 12th of February, 1882.

DELONG'S BOAT.

The sad history which follows is derived from the records of the Commander up to his last feeble entries of October 30, and from the reports of Engineer Melville and Lieutenant Danenhower, their testimony before the Naval Court of Inquiry, and that of the seamen Nindemann, Noros, and Bartlett; the first two of these three being the only ones saved from this boat.

The Captain's brief journals of September, 1881, record: "At 9 P.M. Sept. 12, lost sight of whale-boat ahead; at 10 P.M. lost sight of second cutter astern; wind freshening to a gale. Step of mast carried away; lowered sail and rode to sea anchor; very heavy sea, and hard squalls. Barometer falling rapidly.

"13th, very heavy northeast gale. . . . At 8 P.M. set a jury sail made of a sled cover, and kept the boat away to the westward before the sea; —17th, grounded at a few hundred yards, landed at 8 P.M.; dark and snow storm, but Collins had a good fire going; at 10.20 had landed everything, except boat oars, mast, sled, and alcohol breakers; —18th, had fires going all the time to dry our clothes, we must look our situation in the face, and prepare to walk to a settlement.

"September 19, ordered preparations to be made for leaving this place, and as a beginning, all sleeping bags are to be left behind. Left in instrument box a record portions of which read thus:—

“LENA DELTA, Sept. 19, 1881.

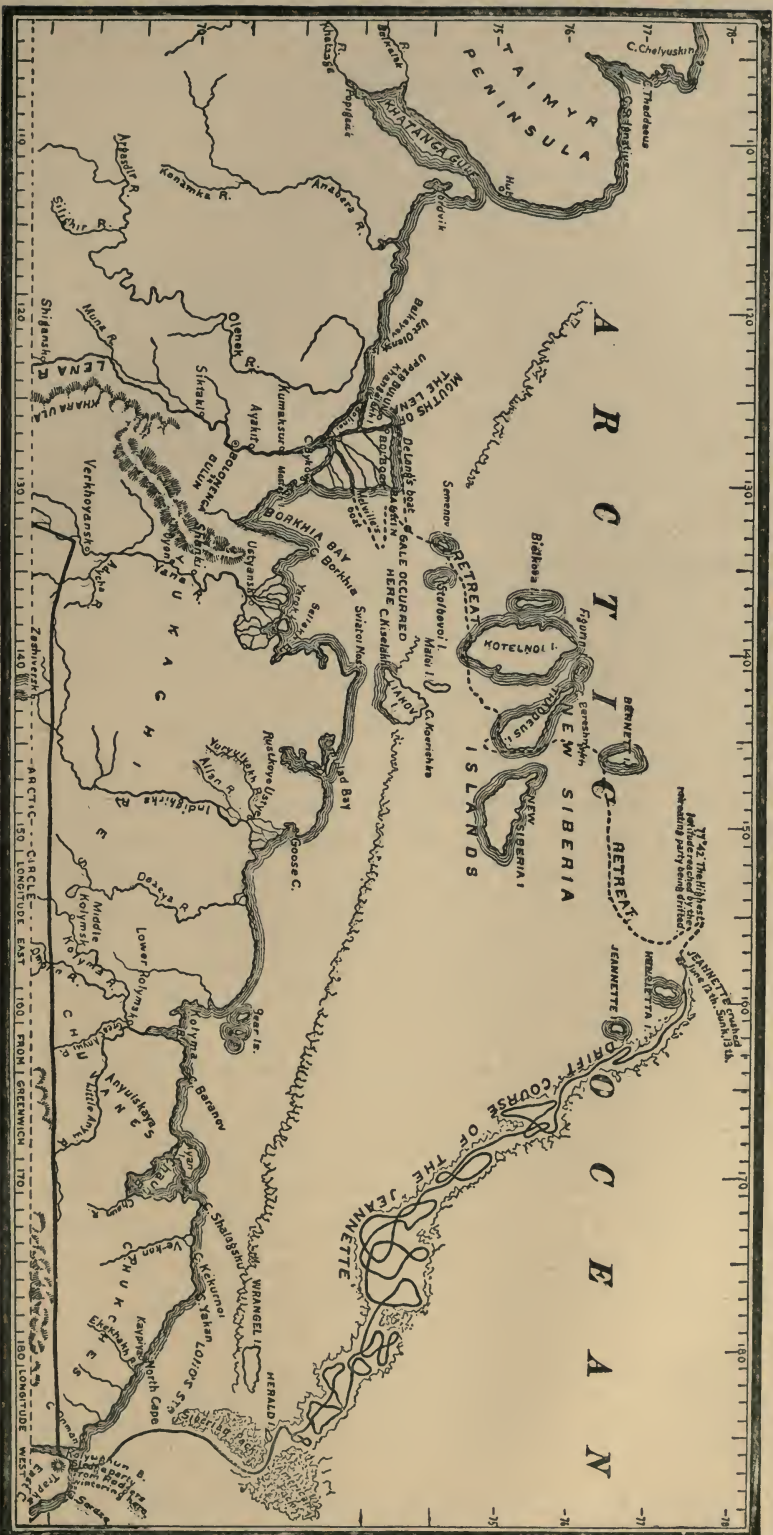
“Landed here on the evening of the 17th, and will proceed this afternoon to try and reach, with God’s help, a settlement, the nearest of which I believe is ninety-five miles distant. We are all well, have four days’ provisions, arms and ammunition, and are carrying with us only ship’s books and papers, with blankets, tents, and some medicines, therefore, our chances of getting through seem good. . . . At 2.45 went ahead, and at 4.30 stopped and camped. Loads too heavy—men used up—Lee groaning and complaining, Erickson, Boyd, and Sam, hobbling. Three rests of fifteen minutes each of no use. Road bad. Breaking through thin crust; occasionally up to the knees. Sent Nindemann back with Alexai and Dressler to deposit log-books.

. . . Every one of us seems to have lost all feeling in his toes, and some of us even half way up the feet. That terrible week in the boat has done us great injury; opened our last can of pemmican, and so cut it that it must suffice for four days’ food, then we are at the end of our provisions and must eat the dog (the last of the forty) unless Providence sends something in our way. When the dog is eaten——? I was much impressed and derive great encouragement from an accident of last Sunday. Our Bible got soaking wet, and I had to read the Epistle and Gospel from my prayer-book. According to my rough calculation it must have been the fifteenth Sunday after Trinity, and the Gospel contained some promises which seemed peculiarly adapted to our condition. (The passage is in Matthew v. 24).

“September 21, at 3.30 came to a bend in the river making south, and to our surprise two huts, one seemingly new. At 9 P. M. a knock outside the hut was heard and Alexai said, ‘Captain, we have got two reindeer,’ and in he came bearing a hind quarter of meat. September 24, commenced preparations for departure from the hut at seven o’clock. . . . At 10 P. M. made a rough bed of a few logs! wrapped our blankets around us and sought a sleep that did not come; 27th, made tea at daylight, and at 5.05 had our breakfast—four-fourteenths of a pound of pemmican. . . . At 9.45 five men arrived in camp, bringing a fine buck. Saved again!! September 30, one hundred and tenth day from leaving the ship, Erickson is no better, and it is a foregone conclusion that he

THE JEANNETTE IN THE PACK.

Map showing her Drift to and fro with the ice and the line of the Crew's Retreat, as charted at Irkutsk by Lieutenant Danenhöwer.



NOTE.—“The above chart was made from a sketch chart that was constructed during the retreat over the ice. Owing to lack of paper it was made on the back the advertisement that came with Liebig’s Extract of Beef. The Mercator projection, however, was correct.”

must lose four of the toes of his right foot, and one of his left. The doctor commenced slicing away the flesh after breakfast, fortunately without pain to the patient, for the forward part of the foot is dead: but it was a heart-rending sight to me, the cutting away of bones and flesh of a man whom I hoped to return sound and whole to his friends. October 1, the doctor resumed the cutting of poor Erickson's toes this morning, only one toe left now. And where are we? I think at the beginning of the Lena River at last. My chart is simply useless. Left a record in the hut that we are proceeding to cross to the west side to reach some settlement on the Lena River. October 3, nothing remains but the dog. I therefore ordered him killed and dressed by Iverson, and soon after a kind of stew made of such parts as could not be carried, of which everybody, except the doctor and myself, eagerly partook, to us it was a nauseating mess. . . . Erickson soon became delirious, and his talking was a horrible accompaniment to the wretchedness of our surroundings. During the night got his gloves off; his hands were frozen. At 8 A. M. got Erickson (quite unconscious) and lashed on the sled under the cover of a hut, made a fire and got warm. . . . Half a pound of dog was fried for each one, and a cup of tea given, and that constituted our day's food. At 8.45 A. M., our messmate, Erickson, departed this life. October 6, as to burying him I cannot dig a grave, the ground is frozen, and I have nothing to dig with. There is nothing to do but to bury him in the river. Sewed him up in the flaps of the tent, and covered him with my flag. Got tea ready, and with one-half ounce alcohol, we will try to make out to bury him. But we are all so weak that I do not see how we are going to move.

"At 12.40 P. M. read the burial service, and carried our departed shipmate's body down to the river, where, a hole having been cut in the ice, he was buried; three volleys from our two Remingtons being fired over him as a funeral honor.

A board was prepared with this cut on it:—

In Memory,
H. H. ERICKSON,
Oct. 6th, 1881.
U. S. S. Jeannette.

And this will be stuck in the river bank abreast his grave. His clothing was divided up among his messmates. Iverson has his Bible and a lock of his hair. Kaack has a lock of his hair. . . . Supper, 5 P. M., half pound dog meat and tea. October 9, sent Nindemann and Noros ahead for relief; they carry their blankets, one rifle, forty pounds ammunition, two ounces alcohol. . . . Under way again at 10.30, had for dinner one ounce of alcohol. Alexai shot three ptarmigan. Find canoe, lay our heads on it and go to sleep.

"10th, eat deer-skin scraps. . . . Ahead again till eleven. At three halted, used up. Crawled into a hole on the bank. Nothing for supper, except a spoonful of glycerine. 17th, Alexai died, covered him with ensign, and laid him in a crib. 21st, one hundred and thirty-first day, Kaack was found dead at midnight. Too weak to carry the bodies out on the ice; the doctor, Collins, and I carried them around the corner out of sight. Then my eye closed up. Sunday, October 23, one hundred and thirty-third day—everybody pretty weak—slept or rested all day, then managed to get enough wood in before dark. Read part of divine service. Suffering in our feet. No foot gear.

"Monday, Oct. 24, one hundred and thirty-fourth day. A hard night.

"Tuesday, Oct. 25, one hundred and thirty-fifth day. No record.

"Wednesday, Oct. 26, one hundred and thirty-sixth day. No record.

"Thursday, Oct. 27, one hundred and thirty-seventh day. Iverson broke down.

"Friday, Oct. 28, one hundred and thirty-eighth day. Iverson died during early morning.

"Saturday, Oct. 29, one hundred and thirty-ninth day. Dressler died during the night.

"Sunday, Oct. 30, one hundred and fortieth day. Boyd and Görtz died during the night. Mr. Collins dying."

The preceding brief extracts from this saddest of all journals tell the story of the first cutter, excepting that of the two saved, Nindemann and Noros. The Captain, the Surgeon, and the last one of the crew must have perished almost immediately after the last one of their comrades.

THE JOURNEY OF NINDEMANN AND NOROS.

According to the testimony of Seaman Nindemann, DeLong, on the 9th of October, had called him aside and said to him: "I think you have to go only about twelve miles to a settlement called Ku-mark-surka, and you and Noros can make it in three days, or at the longest, four. Do the best you can; if you find assistance come back as quick as possible; and if you do not, you are as well off as we are."

The two men started off with three cheers from their comrades, and a copy of the captain's chart, by which he worked. On their first day they killed one ptarmigan; on the second, failing to secure a deer they made a supper on a boot sole soaked in water and burned to a crust, with some Arctic willow tea; on the morning of the eleventh, they again started on their way South, and at 12 M. stopped to make use of some of the alcohol, but on finding that the bottle in their pocket had been broken, dined on another boot sole with Arctic willow tea, and supped upon some deer bones that were burned in a hut. On the 12th they were somewhat more fortunate, for on gathering some drift-wood, Noros looking into the hole beneath it drew out two fishes, and Nindemann caught a lemming. The day following, having nothing to eat, a piece of seal-skin pants was cut off, soaked in water and burned to a crust, and on like food they subsisted until the 20th, when they found in a kayak near another hut, fishes enough to keep them alive for some days; they were becoming very weak by dysentery.

On the 22d, looking through the crack of the hut in which they were resting, they saw a native who, on the evening of the same day, returned with others, and putting the two men on deer sleighs, drove with them until midnight to their tents, into which they took the two seamen and fed them. The natives, after securing a number of deer, carried the two further forward, and, after learning from them, by the assistance of a tall Russian, that they wished to be carried to Bulun, the most northern Russian settlement in Siberia, landed them at that place on the 29th. Here Noros wrote, at Nindemann's dictation, a letter to the American minister at St. Petersburg, informing him of the condition of DeLong and his party. November 3, the two men heard

the door of their hut in Bulun open, and the voice of Engineer Melville, who exclaimed, "Noros, are you alive?" They gave him all the details from the time they had landed. The engineer made himself a chart on which were marked the huts they had found and their route as well as they could tell it, in order for his immediate arrangements to search for DeLong and his party. The telegram which the men had intended to be sent to the American Minister had been addressed by the commandant at Bulun to Engineer Melville, as to one far nearer than St. Petersburg. Both the seamen were now very sick from exhaustion and dysentery caused by eating decayed fish.

MELVILLE'S SEARCH.

Engineer Melville immediately forwarded three telegrams: one to the Secretary of the Navy, a second to the U. S. Minister at St. Petersburg, and the third to Mr. J. G. Bennett at Paris. The first telegram, sent by Government couriers the long journey to Irkutsk, was received there by American Chargé Hoffmann December 22, and by Secretary Hunt at Washington the day following. The Secretary immediately replied as follows:—

"Omit no effort. Spare no expense in securing safety of men in second cutter. Let the sick and the frozen of those already rescued have every attention, and as soon as practicable have them transferred to milder climate. Department will supply necessary funds."

The U. S. Chargé at St. Petersburg had also telegraphed to Melville that his dispatch to the Navy Department had been forwarded.

After sending the dispatch, Melville pushed his search to the northern extremity of the Lena Delta. Leaving Burulak November 5, with two dog teams, two natives, and food for ten days, he visited some of the huts spoken of by Nindemann and Noros, and on receiving from some native hunters some of the records left by Captain DeLong, and, learning from these papers where he had left the log-books, chronometers, and other abandoned articles, found the cache which was marked by a tall flag-staff on the ocean shore, and secured the logs and other things. A further diligent search

of three weeks, made with great suffering and exposure, revealed, however, nothing of the missing party; nor had the natives heard of them at any of their settlements. Nindemann had expressed his conviction that all must have perished; it was now matter of painful but irresistible conclusions. Melville could hope to do no more until the season opened and until full arrangements could be made for the necessary supplies, and for the orders to subordinates which should be issued by the Russian authorities. This could not be accomplished at Bulun. He went forward to Yakutsk, arriving there December 30.

January 10, 1882, he sent forward the logs and papers in charge of Lieutenant Danenhower, and pushed his preparations for the renewed search under the orders from the Navy Department now received.

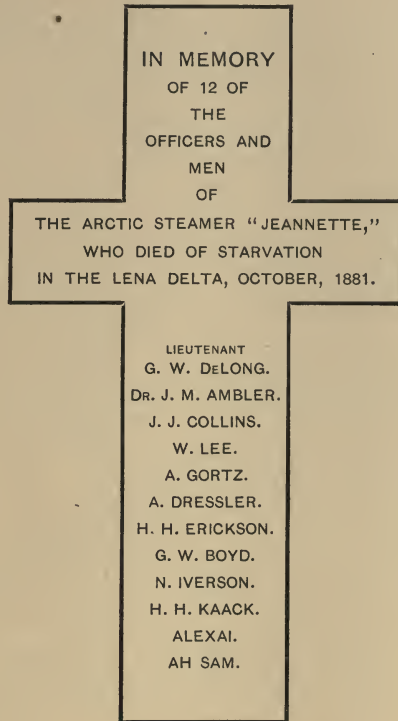
March 16, accompanied by Seamen Nindemann and Bartlett, the latter of whom had picked up some Russian, he found the hut where DeLong and his comrades had slept before crossing the river; and on the 23d found not the living but

THE DEAD TEN.

Four poles lashed together and projecting out two feet from the snow-drift, pointed to their resting-place. The muzzle of a Remington rifle also stood above the snow bank eight inches, its strap hitched over the poles. A few hundred yards further were the three bodies of Captain DeLong, Surgeon Ambler, and Ah Sam, the Chinese cook. Alongside of DeLong was his note-book with the last feebly written lines which have been cited; under the poles were the books and records with which the conscientious care of the commander had too heavily loaded himself and party. Alexai's body was searched for in vain; DeLong's Journal showed that he died in the flat boat. It is probable that the remains of the native were borne by the flood into the Lena. Erickson, as has been stated, had been buried by DeLong in the river.

The natives with Melville were at first afraid to break the bodies out of the snow bank; they were frozen to the ground, and it required prying with sticks of wood to get them up. The Captain's left arm had been seen sticking up out of the snow.

Nindemann, with Bartlett, under Melville's direction took everything from the bodies, tying up each parcel separately in handkerchiefs found upon them, the only exception to the bringing away of which for their friends, being a bronze crucifix found upon the person of Mr. Collins, which, by Melville's orders, was replaced in the bosom of his shirt, to be buried with him. After much further digging in the snow, and



finding a number of other small articles, Melville had all the bodies carried over the mountain to the southward of Mat-Vai, where, on a high bluff, a tomb had been prepared, and a box to hold the bodies. They were arranged side by side, DeLong, Ambler, Collins, and the others in regular rotation, as their names were cut on a vertical portion of a cross placed over the tomb.

The tomb itself was covered with seven-inch plank its whole length, and the cross shored with diagonal braces to the edge of the box, a regular pyramid being built over the tomb, which was covered

with rough stones, from one hundred and fifty to two hundred pounds at the base, with small pieces at the top and sides. The cross arm was hoisted into its place, and keyed by Nindemann with a large wooden key to keep it in place. The cross was twenty-two feet high, the arm twelve feet in length. Upon it was the inscription shown on the preceding page.

Arrangements were subsequently made at Yakutsk to have the entire cairn covered with a deep layer of earth, to prevent the possibility of the sun thawing the bodies therein. General Tcherniaeff also caused a Russian inscription to be prepared, to be placed on the tomb, and directed that every care should be taken to preserve the tomb and the monument in good condition. "Standing as they do on an eminence, they are conspicuous objects, and may be seen at a distance of twenty miles." (*Mr. Newcomb's Narrative.*)

THE SEARCH FOR CHIPP.

During the first week of April, Engineer Melville's party, having completed the burial of the bodies, were put upon the search for the second cutter, under the command of Lieutenant Chipp. Nindemann and Bartlett were sent to Cape Barkin, from which point one of them examined the sea-coast of the Delta southward as far as Jamavaeloch, working also into the mouths of the rivers; the other followed the north coast of Siberia to the river Osoktok, along which DeLong and his party came. Their orders were executed in the most thorough manner, but no trace of the second cutter was found. The first cutter was found where she had been abandoned in the ice of the ocean, filled with water, frozen in, and badly stove.

Melville searched the coast line west to the deserted village of Chancer, thence across the peninsula, down the river Alanack to the ocean; along the coast, in and out of all the bays to the northwest point of the Delta, and thence along the north coast; completing the coast-wise search for the second cutter, by a still further search to the river Jana.



THE TOMB.

The sledging season was now at an end. He was detained on the mountains by the melting of the snows, but reached Yakutsk June 8. Hearing here that Lieutenant Harber had found it impossible to charter at fair rates the expected steamer for the Lena, and was making other preparations for his summer search, but prevented from meeting him, Melville sent Bartlett to report for duty under the Lieutenant, and sent with him a track chart of the search already made on the Delta. From Irkutsk Melville began his home journey with Nindemann and Noros, arriving in New York September 13, 1882.

FURTHER SEARCH.

Lieutenant Harber and Lieutenant Schuetze had arrived in St. Petersburg February 20. Here they received special assistance from General Ignatieff, the Governor-General of Siberia, and United States Chargé Hoffman. On arriving at Nijni Ujinsk, on the way to Irkutsk, and meeting with Lieutenant Danenhower's home party, they received, by permission of the Secretary of the Navy, as volunteers in the further search for Chipp, Seamen Leach, Wilson, Mansen, Lauderback, and the Indian, Aneguin. Noros had before this gone back with Mr. Jackson, special agent sent out by Mr. Bennett from Paris. Harber during the month of May went down the river to Viska in a chartered steamer, but found the vessel unfit for the object in view, and consequently secured others by reconstructing a purchased boat and building two dories. June 11 he was prepared to search the Delta.

In his report of November 29, 1882, Secretary Chandler states that Harber and Schuetze had prosecuted the search with energy, but had not succeeded in getting any intelligence of Lieutenant Chipp's party.

PREPARING TO BRING THE BODIES HOME.

The latest information received from Russia nearly at the date of this writing, is furnished in the following letters—an unhappy closing of the record of the voyage of the "Jeannette." It will be seen from

Lieutenant Harber's first letter that no fond hopes of recognition of the lost ones can be now indulged, although such hopes were justly conceived perhaps in the breasts of the bereaved by the conditions of the climate and the careful entombment secured by Engineer Melville.

“IRKUTSK, SIBERIA, June 23, 1883.

“Hon. W. E. CHANDLER, *Secretary of the Navy, Washington, D. C.*

“SIR,—I have the honor to report as follows concerning the removal of the bodies of Lieutenant-Commanding DeLong and party.

“The requisite permission to remove these bodies was not received at Yakutsk until January 25, and on the 26th I started north with Mr. Schuetze and a Cossack interpreter. Before starting we were distinctly informed that we could have no assistance from the Government, and in fact throughout the journey to Mat-Vai and return we received none.

“We encountered many difficulties, but they did not prove serious; merely delayed us a few days.

“The natives were glad to furnish both reindeer and dogs, and for their use charged little more than the Government rates.

“In travelling four thousand versts (two thousand six hundred and sixty-seven miles) with deer, but two animals died, apparently from exhaustion, and these were paid for; no dogs were in any way injured. I mention this to answer the objections to the journey made by the authorities before the permission was granted.

“We reached Bulun February 20, and Beemoviolach February 22. We were detained here four days by a severe gale, but at its close at once proceeded to Mat-Vai, reaching it March 1. On the 2d we went to the tomb, removed the bodies, rebuilt the tomb, and, returning to Mat-Vai, prepared for the return trip.

“Learning from the telegrams of the Department, through our minister at St. Petersburg, that the caskets now at Orenburg were not to be forwarded, and being informed by the Governor that the caskets were a necessity, whether the bodies were to be transported in winter or in summer, I made arrangements with the Government physician for properly preserving the bodies in their frozen condition during the

summer months, and leaving Mr. Schuetze to see these arrangements carried out, I set out for Irkutsk to obtain materials for the caskets.

"I was told in Yakutsk that the law required sheet-lead for the lining, and hence expected to go to Russia for this material. However, I found in this city sheets of pure tin, and obtained permission of the Governor to use this material for the temporary caskets, the bodies to be transferred to the ones in Orenburg on our arrival. All necessary articles were forwarded when the river broke up last March. As soon as the road opens in November, I will proceed home with the bodies. If no unforeseen difficulties appear, I should reach Orenburg between January 30 and February 1, 1884. The bodies are much decayed, and recognition impossible.

"Before Ensign Hunt and party left me, I obtained from James Bartlett, fireman, a description of each body, its position, dress, etc., as it was when last seen. This description was found to be so exact that no difficulty or doubt occurred in their identification, and each was carefully marked as it came from the tomb.

"There will be some difficulty in straightening the limbs in consequence of the amount of decay which occurred last summer, but the surgeon tells me it can be done.

"Very respectfully, your obedient servant,

(Signed)

"GILES B. HARBER,

"U. S. Navy."

Lieutenant Harber's second letter, received at Washington Nov. 14, 1883, reads:—

"YAKUTSK, Aug. 24, 1883.

"HON. WM. E. CHANDLER, *Secretary of the Navy* :

"SIR,—I have the honor to inform the Department that after furnishing materials for temporary caskets, and drawing ten thousand rubles from our Minister at St. Petersburg, I have returned to Yakutsk. I find that after our departure for Kitach last October, a pocket-knife marked 'J. Q. A. Zeigler,' and a spoon, were found on the route taken by DeLong, and brought to the Russian Meteorological Station near

Kitach, and by Lieutenant Gurgens forwarded to Governor Tcherniaeff. They will be brought home. It is evident they belonged to DeLong's party.

"Aneguin having died of a contagious disease, his body of course cannot be brought home. On our way north, I stopped at Kernisok, and visited his grave, and left instructions to have it suitably marked in accordance with a sketch which I have forwarded from this place. The Assistant Ipravnik kindly offered to see my instructions carried out.

"Very respectfully, your obedient servant,

"GILES B. HARBER."

The letter which follows, written by an "occasional correspondent" of the *New York Tribune* (probably by one of Lieutenant Harber's party) furnishes material of much interest, and explains some points not embraced in the brief official letters which have been quoted.

"ST. PETERSBURG, Nov. 10.

"A year ago last February Lieutenant Giles B. Harber and Lieutenant W. H. Schuetze, of the United States Navy, left this city on their way to the Lena Delta to search for Lieutenant Chipp and the other missing men of the "Jeannette." About the middle of this month, the weather permitting, they will leave Yakutsk on their long journey homeward with the remains of Lieutenant-Commander George W. DeLong, captain of the 'Jeannette,' and the ten men who died with him at the mouth of the Lena in 1881.

A LONG DELAY IN SECURING COFFINS.

"When Lieutenant Harber returned to Yakutsk on Nov. 29, 1882, from the Lena Delta, without any news of the missing men, he found awaiting him orders to take home the remains of DeLong and his companions. The bodies could not be removed from the tomb Chief Engineer Melville built — near Mat Vai — without permission from the Russian Minister of the Interior, and this was not received by Mr. Harber until Jan. 25. 1883. While waiting nearly two months for authority to remove the bodies he made all preparations to start northward again without delay, and on January 26, he and Mr. Schuetze left Yakutsk for the Delta. They accomplished their task successfully and returned to Yakutsk on March 29, only to discover that they must remain almost a year longer in Siberia. The report current at the time was that the United States Government had instructed them to take the bodies home in the winter season, so that they might be transported frozen. If such an order was given, it does not appear to have been necessary, for with suitable coffins the bodies could have been brought to Russia without delay. Such coffins, however, were not

to be had in Yakutsk, and for some reason the metallic ones sent from the United States had not been forwarded to that city. These coffins not being in Yakutsk, a large portion of the delay since last March has been unavoidable. When Mr. Harber found that the Russian law would not permit the removal of the bodies at any season of the year except in air-tight coffins, and that these could not be obtained in Yakutsk, he at once journeyed to Irkutsk, to obtain permission from the Governor-General to use pure tin or some other suitable material as a lining to ordinary coffins. In this way he hoped to make coffins that would come within the provisions of the law and serve until the bodies could be transferred to the metallic ones sent from New York. But it was not an easy matter to obtain permission to do this, and it was not until late in July that he was able to leave Irkutsk for Yakutsk, with authority to make the temporary coffins, and the necessary materials. The coffins were completed in good time, but he was compelled to wait a little while longer for the Lena to freeze over before he could start on the homeward journey. It is to be hoped that neither man nor weather will throw any further obstacles in his way, and that he will soon be able to leave Yakutsk. If he is favored with good weather and has reasonable aid in his journey, he will reach New York some time in February.

A MID-WINTER TRIP TO THE LENA DELTA.

"When Lieutenant Harber received permission to remove the bodies of DeLong and his men from the tomb, he started, as has been stated above, immediately for the Lena Delta. He left Yakutsk with Mr. Schuetze and a Cossack, taking with him a train of six sleds, three of which were loaded with provisions, materials for constructing new sleds, and felt in which to wrap the bodies. He started northward a year and five days after Chief Engineer Melville began his journey to search for DeLong. Last year the Government had the entire road prepared for Mr. Melville, deer being held for him at every station, and after leaving Verchoyansk he was fortunate enough to have the personal assistance of the Ispravnik. The Government gave Melville all the assistance possible, because he was upon an errand of mercy. But the removal of the bodies was a different matter, and in such a case the local officials had no authority to lend a helping hand. Mr. Harber was permitted to make the journey, but he had to depend entirely upon his own resources.

"In going from Yakutsk to the mouth of the Lena in the winter, the valley of that river is not followed. A shorter and better route is obtained by going northward across the Aldan River, over the Verchoyansk Mountains and then down the valley of the Jana River, to the eastward of the Lena. Mr. Harber followed the same route that Melville took, except that he was obliged to travel much further, going to the mouth of the Omalvi and then to Bulun, while the last four hundred versts of Melville's journey were over the direct road to Bulun. Melville, with the assistance of the Government, made the northward journey in twelve working days; Harber, without the aid of the Government, made it in twenty-three days. Harber's entire journey occupied sixty and one-half working days, and when he returned to Yakutsk on March 29, the officials were surprised at the good time made and the successful transportation of the bodies.

DRIVEN FROM THE PASS BY AN ARCTIC GALE.

"This road is probably the steepest travelled one known, and its passage is rendered more difficult by the frequent high winds. On approaching the pass, Lieutenant Harber's party had fine weather, the day being clear and calm, and the thermometer at -30° F. As the train drew nearer to the pass, however, a light air was felt. The deer-drivers did not appear to like it, but the train moved on. The wind grew stronger gradually as the train moved on, and when the party emerged from the woods near the foot of the steepest part of the pass it was met by a gale from the north. The wind was not only strong, but it was intensely cold. The deer could not face it, and the party was compelled to turn back and travel nearly all night to the nearest shelter, a powarni, or cooking-house, on the south side of the mountains. About the middle of the following day there were signs that the wind would change to the south, and the deer were at once started as quickly as possible for the pass which was reached in good season. It took the train from 10 P.M. to 1 A.M. to cross the ridge, the wind blowing a moderate gale from the south.

"When Verchoyansk, on the Jana, was reached, a contract was made with a deer-owner for the transportation of the bodies, and after consultation it was decided not to go direct to Bulun, but to the mouth of the Omalvi and then across the Borchaiia Bay to Gemovialocke Island (at the mouth of the southeastern branch of the Lena), where dogs for travelling in the Delta were to be obtained. When the party reached Borchaiia Bay, it found that the continued high winds had blown the snow from the ice. The deer could not travel over the uncovered ice, and their owner refused to follow the shore of the bay and save the time it would take to go south-eastward to Bulun. To Bulun the train was driven, and then to Kumaksurk, Bukoff, and Gemovialocke. When the latter place was reached the party was met by a povrga. In fifteen minutes, though overhead the sky was beautifully clear, the air for many feet from the earth was filled with a mass of snow, with air spaces somewhat larger than exist when the snow is lying on the ground. Objects at a distance of thirty feet could not be seen. There was some trouble in securing dog-teams, because of the scarcity of dogs, but when the gale, which lasted three days, was over, the party started for Mat Vai with seven teams of twelve dogs each.

REMOVING THE BODIES FROM THE TOMB.

"Three days' travelling, with good weather, brought the party to Mat Vai, where the ten men spent the night in a hut twelve feet square. The good weather continued during the next day, and at noon the party halted at the tomb containing the remains of DeLong and his companions. To open the tomb, remove the snow and expose the bodies was the work of less than an hour. From descriptions as to clothing and position, Mr. Harber was able to identify the bodies, and as each one was removed it was carefully marked and wrapped in felt. By nightfall the tomb was empty and again closed, and the party was at Mat Vai, ready for an early start in the morning. The run up the Lena to Bulun was a hard one. The loads were heavy and the ice was rough, and for a portion of the time the party had to con-

tend with strong head-winds and drifting snow. At Bulun a sled for each body was made, as all were so crooked that two could not easily be carried on one sled. After some delay in securing deer, the train again started with sixteen sleds and forty deer. The rest of the tedious journey was made slowly, the deer being poor and often giving out. But by struggling on day and night, Yakutsk was reached in safety on March 29, just as thawing weather set in. Throughout the journey the cold was great, the thermometer falling on one day to -69° F.

"Since leaving St. Petersburg, eighteen months ago. Mr. Harber and Mr. Schuetze have had anything but a pleasant time. Their best beds for ten months were planks covered with deer-skins, and for many days they slept upon wet ground, often in the mud. Their diet has been fish, reindeer-meat, rice, and hard, black bread, to which were added potatoes, birds, white bread, frozen cabbage, and salt cucumbers while they were in Yakutsk."

In closing this record of American heroism, one or two reflections may be permitted. This voyage certainly brings to the pages of history a memorable story. If the Pole, or even a very high latitude, could have been reached by this route, or if, at the season of 1879, Wrangell or Herald Islands could have been made by any one, DeLong and his noble comrades would have secured one or all of these objects. Their professional ability, courage, energy, and fortitude are in proof.

The Naval Court of Inquiry, after a most thorough examination of all the survivors of the Expedition, reported, as regards the performance of the duties expected from its officers, that the evidence shows "that in the management of the 'Jeannette' up to the time of her destruction, Lieutenant Commander DeLong, by his foresight and prudence, provided measures to meet emergencies, and enforced wise regulations to maintain discipline, to preserve health, and to encourage cheerfulness among those under his command; and the physical condition of the people was good, with the exception of a few cases of lead poisoning, the result of eating canned provisions. The fact of the ship's having passed a second winter in the pack without any appearance of scurvy on board, sufficiently attests the excellence of the sanitary arrangements adopted, and reflects great credit upon her medical officer, Passed Assistant-Surgeon James M. Ambler, who throughout the expedition was indefatigable in the performance of his duties." It was to his constant care of the sanitary condition of the ship and

the ship's company in regard to the air, light, ventilation, and drinking water, that the "Jeannette" passed through two such depressing winters without a touch of scurvy. Of the meteorologist, Mr. Jerome J. Collins, DeLong spoke as a gentleman who commended himself by his intelligent zeal and his determination to secure the best results of the expedition. Lieutenant Danenhower's narrative testifies to his usefulness as a meteorologist. His predictions of the southeast drift of June, 1881, were in keeping with his like accurate forewarnings while he was the meteorologist of the *New York Herald*.

But the condition of the ice from even the date of August 1 of the year 1879-80 was exceptionally different, as has been shown, not only from DeLong's expectation, but from that of the years immediately preceding. Giving full weight then to the disadvantageous delay experienced by his search for Professor Nordenskiöld—a delay commented upon with justice by the Naval board—it seems clear that even without this delay, DeLong's urgent desire to put his ship into winter quarters in some harbor in Wrangell Land such as afterwards found by Berry, could not have been accomplished. His journal of September 4 reads: "At 2 P.M. the greatest amount of water space seeming to be to the northeast, the 'Jeannette' made her way in that direction generally, and, at 4.30 had succeeded in getting out of the pack into the open sea." Seaman Nindemann also testifies that coming down from the crow's nest he reported to the Captain that there was plenty of water northward and eastward, to which DeLong answered: "I wish to try and make Wrangell Land if I can." Nindemann further testified that on steaming a little to the northward, the ship struck a large lead that ran in toward Wrangell Land, and as there were still large holes of open water to the westward, if she could have forced her way through the ice for about fifty yards ahead, she would have made further progress; but, that in the night of the 5th, the ice had closed together and the young ice formed so thick it was impossible for a ship to steam through. If he "had had charge of the ship at that time, he would have done what Captain DeLong did, if he wanted to reach Wrangell Land." When the ship entered the lead, Septem-

ber 5, he thought "there was a fair chance of getting her through to Wrangell Land."

In connection with such statements, how impressive is the lesson drawn anew from the uncertainties of ice-navigation, and how disheartening DeLong's journal of the 12th:—

"It is unpleasant to realize that our exploration for a whole year should come to a stop on the 6th September, and that at a point which a sailing ship, the 'Vincennes,' reached in 1855 without any difficulty. And here we are in a steamer, and beset in the pack before we are two months out of San Francisco. My disappointment is great, how great no one else will probably ever know. I had hoped to accomplish something new in the first summer."

How promptly arises the now useless regret that a harbor could not have been secured, and the ship's company of the "Jeannette" sheltered on the island, and at the worst, if no further northward progress had been made they had been maintained on their abundant supplies and finally rescued by the "Corwin," the "Rodgers," or some passing whaler.

Once more—how can the further regret be stilled which arises from the fact that through the imperfect information of the charts, and also, it is believed, from some European publications in the hands of Captain DeLong, a landing was made by him at so unfavorable a point, and the uncertain course from it taken on the *Lena Delta* which ended only in destruction? With better information he might have been directed to a safe landing; he was within twenty-five miles of a Siberian settlement.

Yet these unavailing regrets may well give place to the sentiments of reverence and just esteem for the noble dead, and to the consoling reflection that in the judgment of the Naval Court of Inquiry, everything possible was done for their relief. "Considering," the court says, "the condition of the survivors, the unfavorable season, the limited knowledge of the country, the want of facilities for prosecuting the search, and the great difficulty of communicating with the natives; everything possible was done for the relief of the other parties." The Chief of the Bureau of Navigation, Commodore Walker, reports the entry upon the Charts of the U. S. Hydrographic Office, of

the group of islands discovered by DeLong, as the "DeLong Islands," in memory of that gallant officer. The Hydrographer, Commander De Kraft, in connection with this notice says: "that the islands considered an extension of the New Siberian group are thus entered on the Chart, as a lasting testimonial in the regions of eternal ice to the intrepidity of the Commander of the 'Jeannette,' who reached a higher latitude in the Siberian Arctic than any heretofore attained."

The review of the whole voyage which is to be found in the *Bulletin de la Société de Géographie*, 1st Trimestre, 1883, closes thus: "Honor to DeLong, who always knew how to exercise the fullest qualities of courage and of command! Honor to all his comrades, officers, and sailors, whose spirit of discipline and sacrifice is a glory to the navy which counts such men within its ranks." This is the tribute of an impartial judge who had at hand all the elements of a proper judgment.

NOTE.—Since these papers were sent to the press, the author has received from Engineer Melville a copy of a letter (translated from the Russian) written to him by General Tcherniaeff from Irkutsk, in which letter, after repeated expressions of esteem, the Governor gives a detailed list of the crosses of honor, medals, and moneys recently bestowed by the Czar on the Ispravniks and on the natives who assisted Melville and Danenhower in their searches for DeLong and Chipp. The Governor had recommended rewards for the Russian exiles also who had assisted in the search. His letter says that "the papers of these *Criminal Exiles* have been asked for by the Minister, and recommendation is to be made thereon to the Czar for his action." May the humane and prompt deeds of humanity related by Danenhower, as received from some of these poor exiles, recall them from the Siberian wilds to their native lands!

The cable dispatch below gives the latest words from Lieutenant Harber, who with the remains of the ten of the Delta may be expected within sixty days:—

"IRKUTSK, Dec. 21.

"The remains of Commander DeLong and his comrades of the ill-fated 'Jeannette' Expedition have arrived here. The remains were borne in procession through the streets to-day, escorted by a detachment of troops. A multitude of people joined in the cortège. Many wreaths were placed upon the coffins, and printed copies of poems describing the exploits and unhappy end of DeLong and his party were distributed among the crowd. The remains will be taken to America."

These honors were not prompted by curiosity only, for the condition of the bodies was well known. Memorials are proposed for erection at the Naval Academy, Annapolis.

CHAPTER XI.

RELIEF EXPEDITIONS FOR THE "JEANNETTE."

THE FIRST CRUISE OF THE "CORWIN," 1880. — THE MISSING WHALERS.

— INSTRUCTIONS OF SECRETARY SHERMAN FOR THEIR SEARCH AND FOR THE "JEANNETTE." — THE SHIP REFITTED AT SAN FRANCISCO. — ARRIVES AT OUNALASKA, JUNE 7TH. — NIPPED IN THE PACK OFF CAPE ROMANZOFF, JUNE 16TH. — ENTERS THE ARCTIC SEA 28TH. — LAST SIGHT OF THE "MOUNT WOLLASTON" AND "VIGILANT" REPORTED BY CAPTAIN BAULDRY. — VISIT TO THE CAVE DWELLERS ON KING'S ISLAND. — THE COAL VEIN EAST OF CAPE LISBURNE. — WITHIN SEVEN MILES OF HERALD ISLAND. — WRANGELL LAND IN SIGHT. LAND SEEN TO THE NORTH. — RETURN OF THE "CORWIN." — CAPTAIN HOOPER'S NOTES OF THE ICE — OF THE HABITS AND CUSTOMS OF THE NATIVES ON THE SHORES OF THE ARCTIC.

SECOND CRUISE OF THE "CORWIN," 1881. — INSTRUCTIONS OF SECRETARY SHERMAN. — OFFICERS. — SAILING FROM SAN FRANCISCO. — ONALGA PASS. — OUNALASKA. — ST. LAWRENCE ISLAND. — REPORTS OF THE MISSING SHIPS AT CAPE SERDZE-KAMEN. — SLEDGE PARTY TO REACH THE SHORE. — PLOVER BAY. — RETURN TO CAPE SERDZE. — LANDING ON HERALD ISLAND. — CHARACTER OF THE ISLAND. — LANDING ON WRANGELL LAND. — DISCOVERY OF THIS LAND BY CAPTAINS LONG AND RAYNOR, 1867. — THE "CORWIN" THE FIRST TO EXPLORE IT. — HOISTS THE U. S. FLAG. — VISIT TO POINT BARROW. — RETURN TO SAN FRANCISCO. — TRIBUTE TO DeLONG.

THE FIRST CRUISE, MAY 22 TO OCTOBER 12, 1880.

WHEN the North Pacific whaling fleet of 1879 had returned from their cruise later than usual, without bringing any word of the "Jeannette," and it was further learned that two of their number, the "Mount Wollaston" and the "Vigilant," had not been seen later than October 10, and then in the same region where the "Jeannette" had been last seen, much anxiety began to be felt for

the ships. In the spring following, petitions were forwarded to Congress and to the Naval authorities, asking for Relief Expeditions in search of the "Jeannette." The U. S. Treasury Department was first able to offer assistance.

May 15, 1880, Secretary Sherman ordered the Revenue Steamer "Corwin," Captain C. L. Hooper commanding, to proceed from San Francisco on a cruise in the waters of Alaska, chiefly "for the enforcement of the provisions of law and protection of the interests of the U. S. Government on the seal islands, and the sea otter hunting grounds and of Alaska generally; but, additionally, to afford assistance to the two whalers, 'Mount Wollaston' and 'Vigilant' if they should possibly be fallen in with." They had been reported to the Department as having been probably caught in the ice within the Arctic Ocean, while endeavoring to return through Bering Straits.

Captain Hooper was further instructed to make careful inquiries while in the Arctic, regarding the progress and whereabouts of the steamer "Jeannette," and, if practicable, to communicate with and extend any assistance to that vessel. He was permitted in his discretion to remain in the Arctic Ocean as late in the season as might be necessary to accomplish the object of his voyage without encountering undue hazard to his command. The "Corwin" was built at Abina, Oregon, entirely of Oregon fir, fastened with copper, galvanized iron, and locust tree nails; her length between perpendiculars was one hundred and thirty-seven feet six inches; beam moulded, twenty-three feet; over all twenty-four feet; draught ten feet ten inches; tonnage two hundred and twenty-seven, custom-house measurement. She was now strengthened with one-inch oak plank, two feet above water line to six feet below, from stem to stern, put on over the copper and secured with two and a half inch composition nails. She was furnished with a three-eighth inch iron ice-breaker, a new steam windlass was built, and all her machinery thoroughly overhauled and renewed. Under steam she could make eleven knots. Captain E. H. Smith, experienced in Arctic navigation, went out as ice-pilot to the ship's company numbering in all forty persons. They were provisioned for twelve months.

The "Corwin" arrived at Ounalaska after a rough passage of twelve days, sailing from which port June 8, and touching at St. Paul's lat. $57^{\circ} 5'$, long. $169^{\circ} 51'$, she shaped her course for Cape Romanzoff, and at daylight of the 11th, first struck the ice north of Kounivak Island, lat. 60° N., long. 160° W. The heavy pitching and grinding along the edge of the pack made it unsafe to attempt to force the way, and the "Corwin" anchored in a fair harbor until the going down of the gale on the 13th. After working about twenty miles through leads, picked out from time to time, on the 15th Captain Hooper found himself utterly helpless, drifting with the pack southward and eastward about two miles per hour. At 8 A.M. he was in only five fathoms of water among grounded ice, which gave the vessel sharp nips, trying her strength. At one time the "Corwin" was lifted up bodily several feet, and held suspended for some minutes; coming in contact with one, "stern on," the rudder was forced over, the screw steering gear carried away, and the wheel chains parted. Happily the rudder stock, which was of the best Oregon oak, stood the strain, although for a time it seemed as if nothing could save it. On the 16th, the ship continued to drift helplessly all day.

On the 17th, a sharp northeast gale broke up the ice and started it off shore, allowing the "Corwin" to proceed towards Norton Sound and St. Michael's, where she was again detained several days. She had received from the natives the unwelcome news that the previous winter had been the most severe ever known, a report confirmed by the sealers from Norton Sound.

Steaming over to St. Lawrence Island to investigate a report which had been made to the Treasury Department of a fearful starvation of the inhabitants there, Captain Hooper found one village entirely deserted, and in a second not a living being, but many of the dead unburied, the whole number of those who perished being estimated at one hundred and fifty. At other villages they had died by hundreds, the survivors reporting that the weather had been cold and stormy for a long time with great quantities of ice and snow; his again was no encouraging news in regard to the missing whalers and the "Jeanette."



"THE 'CORWIN' IN A NIP, OFF CAPE ROMANZOFF, JUNE 16, 1880."

From a sketch by Captain C. L. Hooper, U. S. Marine.

At 6 P.M. of the 28th, the "Corwin" entered the Arctic Sea; on the 30th she made two whalers, one of which had communicated with the natives at Point Hope, but could learn no good tidings there. Following the ice pack around from Cape Serdze Kamen, and communicating with the natives and whalers on both sides of Bering Strait and within the Arctic Ocean, she learned from them without exception that in their opinion nothing would ever be heard of the "Mount Wollaston"* or the "Vigilant." They were reported as last seen by Captain Bauldry of the "Helen Mar" of New Bedford, forty miles southeast of Herald Island, with clear water at the time to the northward, in which direction they were steering. Captain Bauldry himself had escaped with difficulty by forcing a passage through the new ice which formed rapidly around him, but a sudden change of wind had driven the missing whalers *northwesterly* into the open water, while a heavy body of ice south of them prevented all escape.

From the date last named, until the sailing of the "Corwin" from Unalaska, October 2, for San Francisco, the ship cruised almost with-

* Mr. Newcomb, the naturalist of the "Jeannette," in his volume of "Our Lost Explorers," quotes from Mr. William Bradford of San Francisco, the following unhappy note of an interview at that port between the captain of the "Mount Wollaston" and Lieutenant DeLong. "A short time before Lieutenant DeLong's departure, I suggested to him that we call together all the whaling captains then in port—most of whom I knew well personally—and avail ourselves of whatever information their experience might afford and suggestions they might have to make. He accepted the idea and arranged the meeting, and they all attended. One by one they gave their opinions, mainly upon the point of their greatest interest, the probable direction of the winds and currents at the time when Lieutenant DeLong expected to reach Wrangell Land. But there was one among them who kept ominously silent, not venturing an opinion or offering a suggestion. I finally said: 'Captain Nye has not given us his opinion, and we would like to hear from him.' He said: 'Gentlemen, there is n't much to be said about this matter. You, Lieutenant DeLong, have a very strong vessel, have you not?—magnificently equipped for the service, with unexceptionable crew and aids. And you will take plenty of provisions and all the coal you can carry?' To each of these questions, as it was asked, Lieutenant DeLong replied affirmatively. 'Then,' said Captain Nye, 'put her into the ice and let her drift, and you may get through, or you may go to the devil, and the chances are about equal.' Poor Captain Nye! he ventured in there after Lieutenant DeLong—into those same Arctic regions, in the prosecution of his enterprise as a whaler—and was never heard of again. He was from New Bedford, Mass., was one of the oldest, bravest and best men in the service, and there was no man sailing to the frigid seas who knew more of their perils than he who made that ominous forecast of the probable fate of the 'Jeannette,' if not of her commander."

out delay for the ice-floes or for rest to her crew, steaming over six thousand miles in the Arctic Ocean, without gaining any tidings of the missing vessels. July 6, Captain Hooper communicated with the natives of King's Island, about thirty miles south-southeast from the Diomedes, which lie in lat. $65^{\circ} 38' 40''$, long. $161^{\circ} 41'$. The island is about seven hundred feet high, with almost perpendicular basalt cliffs, on the summit of which were found a number of stone columns resembling the remains of some old feudal castle. The officers of the "Corwin" climbed the steep cliff which rises from the sea at an angle of about 45° , and on which the village of the island was found to be composed of about forty houses; some excavated in the sides of the cliff, others made of walrus skin stretched on poles secured to the rocks outside. Some of these houses are two hundred feet above the water. The natives of this Arctic Gibraltar are very expert with the kayak. It is said that when the surf is breaking against the perpendicular sides of the island, should it be necessary to launch a canoe for any purpose, the native who is to embark takes his seat in his kayak as near the surf as he can approach with safety, secures his waterproof shirt made of the intestines of the walrus to the rim of the hatch, grasps his paddle, and watching a favorable opportunity, gives a signal to two men who stand in readiness, and is thrown entirely clear of the surf. "The kayaks are probably the finest in the world, but, owing to the rough service they have to perform, are made somewhat heavier than those in use in Kotzebue Sound, and are covered with walrus hide."

From King's Island the ship proceeded to St. Michael's and thence to Cape Prince of Wales, the high, ragged, and most western point of the North American Continent, lat. $55^{\circ} 33' 30''$, long. $167^{\circ} 59' 10'$. July 14th, she was at Cape Espenberg on the western side of Kotzebue Sound; on the 19th, after passing Cape Kensenstern she headed for Point Hope, from which she endeavored to start north again, but found it impossible to penetrate the ice.

On the 22d, the southeast gales having driven the pack northward, she rounded Cape Lisburne, where she found the "Mary and Helen" (afterwards the "Rodgers" of Lieutenant Berry's Relief Expedition), which had taken eight whales. East of Cape Lisburne a valuable coal

deposit was visited, lat. $68^{\circ} 50' N.$, long. $164^{\circ} 55' W.$ "The veins of coal on the face of the cliff can be seen distinctly at the distance of one mile, and there is good anchorage with a southerly wind within half a mile of the shore in four fathoms of water and fair holding ground."

On the 28th the ship was in lat. $70^{\circ} 50' N.$; long. $175^{\circ} 0' 3'' W.$, only thirty-five miles from Herald Island, but could not reach it for the solid pack, and stood again southward. August 4, Herald Island was again made, bearing west by north half north by compass, distant about thirty-five miles, and the ship worked toward it through heavy drift ice until it was judged to be but twenty miles distant, when finding it impossible to proceed further, the ice packing close around the vessel, and a dense fog shutting down over the island, it was deemed unsafe to remain longer. While in sight of the island a lookout was kept from the masthead in the hope of seeing smoke or some sign indicating the presence of human beings; nothing could be seen. A Polar monster weighing at least two thousand pounds was shot by Captain Hooper.

Keeping to the southward along the ice pack in long. $176^{\circ} 15'$. Hooper tried to ascertain if it were possible to get around its southern point and up to the southern extremity of Wrangell Land. A dense fog prevented him from determining satisfactorily the condition of the ice in the straits between Wrangell Land and the coasts of Asia, but he was satisfied that, had there been no fog, he could not have reached Wrangell Land.

August 17, Herald Island was again seen bearing south-southwest about seven miles; and on the 20th the ship hauled up for it, steaming in the ice about six miles, when she was stopped by a solid barrier of unbroken ice extending nearly north and south, and from twelve to forty feet in height. After examining the island very carefully with the glass from a distance of only three or four miles, and assuring himself of the impossibility of there being any human beings on it, Captain Hooper worked his way back to clear water.

The sides of Herald Island were seen as perpendicular cliffs eight hundred feet high, its top, then covered with clouds, is said to be six



HERALD ISLAND.

From a sketch by Dr. I. D. Rose, Surgeon, Revenue Steamer "Corwin."

hundred feet higher. Hooper quotes Captain Kellett, R. N., who on discovering it on his voyage in the "Herald" in 1849, succeeded only in getting a foothold on a projecting rock, as describing the island to be four and a half miles in extent east and west, and two and a half north and south, in the shape of a triangle almost inaccessible on all sides, and a solid mass of granite.

Most unhappy anticipations were forced upon the "Corwin" of the experiences which the journal of the "Jeannette" has since revealed as facts in her history. The icy barrier surrounding the island was unbroken and clearly of no recent formation, and Captain Hooper firmly believed that the ice did not leave the island the previous year, and that it is not unusual for it to remain even two or three years; that it rarely breaks up between the island and Wrangell Sound. No whaler had gone west of Herald Island the previous year.

After touching at Point Belcher, Icy Cape, Point Barrow, and Point Hope, on September 10, the "Corwin" passed a few miles again to the southward of Herald Shoal, and, finding the southern limit of the northern pack so changed in position that she could not get as far North by fifty miles as she had gone the 23d of August, followed the pack southwest until the high hills of Wrangell Land were in clear sight, bearing west, one-fourth south (true). Captain Hooper says:—

"That part of Wrangell Land seen, covered an arc of the horizon of about fifty degrees, from northwest, one-fourth north to west, one-fourth south (true), and was distant from twenty-five miles on the former bearing to thirty-five or forty miles on the latter. On the south were three mountains probably three thousand feet high, entirely covered with snow, the central one presenting a conical appearance and the others showing slightly rounded tops.

"To the northward of these mountains was a chain of rounded hills, those near the sea being lower and nearly free from snow, while the back hills, which probably reach an elevation of two thousand feet, were quite white. To the north of the northern bearing given, the land ends entirely or becomes very low. The atmosphere was very clear, and we could easily have seen any land above the horizon within

a distance of sixty or seventy miles, but none except that described could be seen from the masthead. . . . There are numerous reports of whalers having seen this land, and having sailed along its shores with no ice in sight, and their tracks and positions are laid down on the American Hydrographic Chart; their exact position for each day being shown. The fact that the whalers keep no reckoning, and take no observations while whaling, will show how utterly unreliable these tracks must be. They have a general knowledge of the part of the ocean they are in, and keep a close run of the ice pack. Their object is to take whales and to this they give their whole attention.

“Although it is possible that there are times when the shores of Wrangell Land are free from ice, it is still very doubtful; it must certainly be but seldom. The argument is advanced that Point Barrow, which is some miles north of the southern limit of this land, is, at times, entirely free from ice, and that, therefore, Wrangell Land must also be free. The answer to this is, that the immense body of warm water which is constantly pouring through Bering Strait into the Arctic, washes the shores of Point Barrow, but does not pass within two hundred and fifty miles of Wrangell Land. The vast amount of heat diffused in this manner, and its wonderful effects are too well known and understood to need repetition here. I believe, however, that it is possible, at times, for a strong vessel, properly equipped and fitted, to make her way inshore far enough to reach a safe harbor among the grounded ice, within easy travelling distance of the land, where she could remain in safety, and exploring parties be sent out to examine the land. (The warm current spoken of here has been shown to be temporary.)

“I am of the opinion that Wrangell Land is a large island possibly of a chain that passes through the Polar regions to Greenland. Captain Keenan, then commanding the bark ‘James Allen,’ reports having seen land to the northward of Harrison Bay, a few degrees east of Point Barrow, eighty or one hundred miles north: ‘When the fog lifted high land was visible to the northward a long distance away but perfectly distinct.’”

This report will be noted as confirming Lieutenant DeLong's journal record of land thus believed to have been seen to the north when he was near Herald Island. But its existence is, at least, questionable.*

Bidding farewell to Wrangell Land, the "Corwin" steamed eastward, reaching Point Hope September 12, Cape Prince of Wales on the 13th, St. Paul's Island the 21st, and Ounalaska on the 22d. October 2, she set sail for San Francisco, arriving there after a quick and favorable run of ten days. She was forced to the conclusion that the missing whalers had been crushed and carried north in the pack, and that their crews had perished. DeLong, Hooper thought, might be safe.

Two other objects of equal importance with the search had been accomplished: one, the investigation of some dangerous shoals, in regard to which Captain Franklin, Hydrographer of the U. S. Bureau of Navigation, had asked Captain Hooper's attention for the correctness of some coast line on the Hydrographic charts; the other, the seizure and sending to the United States several vessels found engaged in the illicit trade of supplying the natives in Alaska Territory with

* In illustration of the deceptive appearances indicating the supposed existence of land, Dr. Rosse, the surgeon of the "Corwin" says:—

"Not the least curious of the atmospheric phenomena are the modifications of nervous excitability in connection with the perception of light—the wonderful optical illusions witnessed from time to time during periods of extraordinary and unequal refraction. One day in July, at St. Michael's, I saw on looking northward an island high up in the air and inverted; some distant peaks, invisible on ordinary occasions, loomed up and at one time the very shape of a tower-topped building magnified, and suddenly changing, assumed the shape of immense factory chimneys. Again, off Port Clarence, was witnessed the optical phenomenon of dancing mountains and the mirage of ice fifty miles away, which caused our experienced ice-pilot to say: 'No use to go in here, don't you see the ice!' Again, the mountains of Bering Straits have so betrayed the imagination that they have been seen to assume the most fantastical and grotesque shapes, at one moment that of a mountain not unlike Table Mountain, off the Cape of Good Hope; then the changing diorama shows the shape of an immense anvil, followed by the likeness of an enormous gun mounted *en barbette*, the whole standing out in silhouette against the background, while looking in an opposite direction at another time a whaling vessel, turned bottom upward, appeared in the sky. On another occasion, in lat. 70°, when the state of the air was favorable to extraordinary refraction, a white gull swimming on the water in the distant horizon was taken for an iceberg, or more correctly a floe-berg; other gulls in the distance, looming up, looked for all the world like white tents on a beach, while others resembled men with white shirts paddling a canoe.

whiskey and ammunition. The location of Point Hope was found by close observations to be laid down on the U.S. Hydrographic charts, seven miles of longitude too far west; and the land between Cape Serdze Kamen and Koliutchin Bay, about fifteen miles too far to the north.

“THE ICE AND ITS HABITS.”

Careful observations of the ice formations and of its openings induced a report which is best presented in Captain Hooper's own words. He says of the ice and its habits:—

“In that part of the Arctic visited by the ‘Corwin,’ the ice is quite different from that in the vicinity of Greenland. No immense icebergs raise their frozen peaks hundreds of feet in the air. The highest ice seen by us during the season would not exceed fifty feet in height. The average height of the main pack is from ten to fifteen feet, with hummocks that rise to twenty or thirty feet. Occasionally, however, fields are met with which rise forty or even fifty feet above the water. The specific gravity of sea-ice is .91; hence only about a tenth is visible above the surface of the water. A field twenty feet in height may have a depth of nearly two hundred feet. This enormous thickness is caused by one layer being forced upon another by the action of wind and current. The greatest thickness it attains by freezing is about eighteen feet; at that depth, ice ceases to be a conductor of temperature. The maximum depth reached in a single winter is, according to Parry, Wrangell, and other Arctic travellers, about nine and one-half feet.

“The ice of the Arctic Ocean is never at rest. Even in the coldest winters it is liable to displacement and pressure by the currents of air and water. The expansions and contractions, due to changes in temperature, also assist in this disturbance. Owing to these combined causes, the surface of the ice always presents a rough, uneven appearance.

“Along the edge of the pack, during the summer, is generally found a belt of drift-ice, varying in width according to the direction of the wind. When the wind blows off the pack, drift-ice is frequently found

fifteen or twenty miles from the main body. At times the pack itself opens in leads, by which it may be penetrated for several miles. In venturing within the limits of the pack, however, a sharp watch must be kept on the movements of the ice and a retreat made at the first indication of its closing.

“A vessel beset in the pack is as helpless as if she were as far inland, while there is imminent danger of being crushed at any moment.

“When the wind blows on the pack, the drift-ice becomes as close as the pack itself. . . .

“The ‘barrier,’ or that part of the ice which does not break up, varies slightly in position from year to year, but generally may be looked for near Icy Cape during September. It extends westerly as far as Herald Shoal, where it takes a northwesterly direction to the vicinity of Herald Island. Here, in August and September, a lane of open water is generally found extending to the northward. This space is at first filled with broken ice. On our second attempt to reach the island, we steamed up this lane over fifty miles, with the pack in sight from the masthead on both sides. The last twenty miles we were compelled to force our way through drift-ice.

“As stated elsewhere, the ice-barrier extends several degrees further south between Point Barrow and Wrangell Land, than in any other part of the Arctic regions.”

THE INNUITS.

Of the appearance, character, and habits of the natives of these regions of which little has been known, the Reports of this and of the next cruise of the “Corwin” furnish interesting data, additional to those supplied by the late Captain Bailey of the “Rush,” Captain Beardslee, U. S. N., Mr. Dall of the U. S. Coast Survey, and Mr. Elliott and other observers for the Smithsonian and the Signal Service. Their labors and the results are accredited in the Reports of the Smithsonian.

In the Report of this first cruise, Captain Hooper notes some peculiarities of the Coast Indians, and some diversities among them in regard to their habits as compared with those of the Interior and with the Eskimos of the East Coast of North America. He

says of the natives of Nounivah Island, rarely visited by traders on account of shallow waters along the coast, that the inhabitants ran away to the hills at his approach; the next day, however, he succeeded in capturing one man, three women and three children, all much alarmed with the expectation of being killed. Their fears were quieted by a present of tobacco, and the man was persuaded to come on board, and seemed much interested in all he saw, a looking-glass astonishing him more than all else, first alarming and then amusing him. He did not know the use of brandy or whiskey, spitting them out in disgust. Putting his hands on the stove he seemed astonished that it burned him, and tried it a second time. The ten houses of the settlement are built of mud and connected by an underground passage; a common entrance and the only one, is a covered way in the centre of the circle in which they are built, short branches running off to the separate houses.

"The badarka in use differs somewhat from that used by the Aleutian Islanders; the former is shorter and has more beam, and is made to carry only one person. The natives venture out in all kinds of weather, but always in pairs, never going singly. Like the Aleutian Island badarkas, these are made of skin, seal or sea-lion, drawn over a light frame of wood, with a small round hole in the top, in which the native sits and paddles, and from which he shoots or spears game. When night comes on, he draws his badarka on the ice, crawls down out of sight, and, wrapping himself in his 'parkie,' or fur shirt, goes to sleep. They carry their rifles and a supply of seal-meat inside the badarka, and their spears and sled lashed on the top; thus equipped, they are prepared for land or water travel. If caught in a gale they lash two badarkas together and ride it out in safety."

Of the Eskimos of the North American coast, he says:—

"These Innuits (by which name only these people know each other) are totally unlike the Eskimos described in books of travel, being tall and muscular, many of them over six feet in height; one at Cape Krusenstern fully six feet six inches. Their remarkable physical development seems due to a mixture with the Indians of the interior, those living on the Yukon and Tennenah Rivers and other places, having

long muscular limbs and erect figures, showing courage, strength, and endurance. Like all aborigines, the men are lazy and compel the women to perform all the manual labor; Captain Hooper saw two women each with a child on her back, drawing a thirty foot net for salmon, while the men stood by smoking, without offering to assist, although it was evident the task was too much for the women.

"The seal may be called their main stay, the flesh and oil form the chief article of subsistence, the skin furnishes clothing, tents, and boats; cut into thongs, it is used for making nets for catching fish and birds. The oil is burned in lamps which light and warm the tupiks during the long, dark winter nights.

"They hunt seals on the ice in the spring and fall, and show themselves marvels of patience, lying flat on the ice for hours, waiting for a seal to appear. The seal is very shy, and seldom moves far from the hole in the ice, which they keep open by scratching. The hunter approaches cautiously, by crawling over the ice, his body nearly prostrate, raised slightly on one elbow. He has a piece of bear-skin, about two feet long and a foot wide, which he attaches to his leg on the side upon which he rests; this enables him to slide more easily over the ice. The elbow rests upon a ring of grass. He carries a stick, to which is attached the claw of some animal or bird, to use in imitating the scratching of the seal on the ice. In the other hand he supports his rifle, in readiness for instant use.

"In hunting whales the natives use the 'oomiak.' They use spears, with heads of flint or walrus ivory, pointed with iron; the pole is about six feet long, and attached to it by a line of seal-thongs is a seal-skin poke. A number of these spears being thrown into the whale, the pokes prevent him from going far below the surface, and enable the hunters to track him, and be on hand to kill him when he comes up to breathe. The carcass, including flesh and blubber, is used for food, and is the property of every man, woman, and child in the settlement; the bone, however, belongs to those who took part in the capture. The maxillary bones of the whale are cut into strips used for shoeing the runners of their sleds, and for this purpose are said to be superior to iron or steel.

“These natives are nomadic in their habits; although they have winter-houses, to which they return each fall, they travel all summer. Their manner of travelling is peculiar to themselves; they use the oomiak, in which is stowed everything belonging to the entire family, except the working-dogs.

“This oomiak is a boat built of walrus-hide or seal-skin drawn over a wooden frame about thirty feet long, six feet wide, and two and a half feet deep. The frame is fastened with seal-skin thongs, and made with slip-joints, to allow it to work in a sea-way. They are flat-bottomed, sharp at both ends, and with very little shear. The men use paddles and the women oars; they carry a square sail. An ordinary oomiak contains, in addition to the stock-in-trade of oil, skins, etc., a tent of drilling or deer-skin, guns, traps, spears, bows and arrows, a kayak, a seal-skin poke filled with water, a quantity of dried meat, a sled, several pairs of snow-shoes, a fish-net, and several smaller nets for catching birds, a large drum on a pole for the use of the ‘shaman,’ and several seal-skin bags containing skin clothing.



OOMIAK.

“On first approaching a vessel, one native stands up in the bow of the oomiak, and extends his arms at full length, raises them until the hands meet above the head, then, with the arms still extended, he drops them to his side. This he repeats several times, each time saying ‘nakouruck’ (good). If the same sign is made in return, they approach the vessel at once without fear; if not answered, they approach cautiously, from time to time repeating the sign.

“The *personnel* consists of three or four men, about as many women, and two or three children. Add to these two or three dogs, each with a litter of puppies, and some idea may be formed of what a travelling oomiak contains.

“The working-dogs are often left on the beach to follow on foot, which they do, keeping up a continual and most dismal howl. If the

wind comes in ahead, and the natives desire, for any reason, to continue their journey, they paddle in near the shore, harness their dogs, and attach them to the oomiak, after the manner of a canal-boat and horses, settle themselves in the boat, and saying 'nakouruck,' (good!) go on their way at the rate of four or five miles an hour, with no other effort than steering with the paddle, wondering, probably, why white men will build 'oomiak-paks,' (large vessels), when the native style of travel is so much more simple and economical. When they wish to stop for a night or day, they land, pitch their tent, take everything out of the oomiak, and turn it up on the beach, where they are quite as much at home as in their winter-houses; men, women, children, and dogs forming a happy, noisy, dirty family. They eat when they feel hungry, which seems to be nearly all the time, and sleep without regard to time. The dogs eat when they can, and steal anything they can get their teeth through.'

LANGUAGE.

"The native language differs very materially in different localities. Our interpreter from St. Michael's was of no use to us north of Kotzebue Sound, and even there it was difficult for him to understand the dialect. The change is gradual. At each settlement, from Cape Prince of Wales north, we observed a slight difference; the sound of words changed so as to be almost unrecognizable, or the words were dropped entirely and new ones substituted, until almost an entire change had been effected in the language; so that a vocabulary made at Cape Prince of Wales would be almost useless at Point Hope, and entirely so at Icy Cape or Point Barrow. A few substantives alone remain the same all along the coast."

SUPERSTITIONS.

"The religious belief of the Innuits is of a crude, indefinite nature, to the effect that there is a Power which rewards good Innuits and punishes bad ones, after death, by sending them to different places. At some localities they told us that the good went to a place above, while at others it was thought that the place was below. They have only a

confused idea of the subject, however, and seemed anxious to avoid speaking of it any more than was necessary. Their belief evidently teaches nothing of truthfulness, honesty, or other virtue, or that cleanliness is next to godliness.

“‘Shamanism’ is followed by all these people, and, notwithstanding the numerous tricks practised upon them, they seem to have implicit faith in it. Even the ‘shamans’ themselves show an earnestness in their work that makes us wonder, after all, if there is not some virtue in it. Wrangell, who seems to have given the subject some attention, says:

“The ‘shamans’ have been represented as being universally mere knavish deceivers, and no doubt this is true of many of them who go about the country exhibiting all kinds of juggling tricks to obtain presents; but the history of not a few is, I believe, very different. Certain individuals are born with ardent imaginations and excitable nerves. They grow up amid a general belief in ghosts, ‘shamans,’ and mysterious powers exercised by the latter. The credulous youth is strongly affected, and aspires to participate in these supernatural communications and powers, but no one can teach him how he can do so. He retires, therefore, from his fellows; his imagination is powerfully wrought upon by solitude, by the contemplation of the gloomy aspect of surrounding nature, by long vigils and fasts, and by the use of narcotics and stimulants, until he becomes persuaded that he, too, has seen the mysterious apparitions of which he has heard from his boyhood. He is then received as a ‘shaman,’ with many ceremonies performed in the silence and darkness of the night; is given the magic drum, etc. Still all his actions continue, as before, to be the result of his individual character. A true ‘shaman,’ therefore, is not an ordinary deceiver, but rather a psychological phenomenon, by no means unworthy of attention. Always, after seeing them operate, they have left on my mind a long-continued and gloomy impression; the wild look, the bloodshot eye, the laboring breast, the convulsive utterance, the seemingly involuntary distortion of the face and whole body, the streaming hair, the hollow sound of the drum—all conspired to produce the effect; and I can well conceive that these should appear to the ignorant and superstitious savage as the work of evil spirits.”

"While walking around the village," says Hooper, "we were notified that a sick man occupied one of the tents, and that a 'shaman' was then engaged in an attempt to drive out the evil spirit which had possessed him. We were requested not to go to that part of the village, as it might have a bad effect. I told them that our surgeon, who was present, was a 'shaman,' and asked them to allow him to see the sick man, and hold a consultation with the 'shaman.' After some persuasion, they consented to ask the 'shaman' if such an arrangement would be agreeable to him, and one of them advanced alone to the sick man's tent. He returned after a few minutes, and said we might go as far as the entrance, but must remain outside. The sick man was brought to the entrance, and found to be suffering from paralysis of the left side and a skin disease. He was a most pitiable object. The surgeon left some medicine for him, but it is probable that the 'shaman' did not allow him to take it, and that he did not long survive the native treatment."

TOBACCO SMOKING.

"The natives are inveterate smokers. I believe that every man, woman, and child in Arctic-Alaska smokes a pipe. They manufacture their own pipes of brass, copper, and iron. The stem is of wood, about ten inches long, and is in two pieces bound together with strips of whalebone or sinew. The bowls are often made of two or three kinds of metal, as neatly joined as could be done by any jeweller. A small skin bag, hung from the neck, holds the pipe, and a smaller bag, tobacco, flint, and steel, also a quantity of wild cotton, soaked in a solution of gunpowder, which is used as tinder. A sharp-pointed piece of metal, used for cleaning the pipe, is attached to the stem with a thong. In using the pipe, a small quantity of hair from an *at-te-ghe*, or other convenient skin, is put in the bottom of the bowl, and over this some finely-cut tobacco, the bowl holding only a small pinch. The pipe is lighted with flint, steel, and tinder, and the native commences to draw vigorously, swallowing the smoke, which he retains in his lungs as long as possible. A fit of coughing follows, which I at first thought would certainly terminate the life of the smoker in several instances.

It is not an unusual occurrence for a native, who has been without tobacco for a long time, to retain the smoke in his lungs until he falls over senseless, having the appearance of a person under the influence of opium. This state lasts but a few minutes, when the same performance is again gone through with."

Citations of equal interest with the preceding might be largely extended from this report of Captain Hooper's of the date of Nov. 1, 1880 ("Treasury Department, No. 118"). The reader is referred to the Report in full, and to the Medical, Anthropological, Botanical, and Ornithological Notes and Memoranda, written by Surgeon Rosse, Professor John Muir of California, and Mr. E. W. Nelson; published as "Executive Document 105, House of Representatives," the only portion of the full Report of the Second Cruise of the "Corwin," 1881, as yet ordered for publication by Congress.

In closing the first Report, Captain Hooper expressed himself as at first in doubt as to the safety of the "Jeannette." He considered the ship to be a stronger and better fitted vessel for the Arctic Seas than any of the whalers, and her crew thoroughly equipped for sledge travel; and thought that if DeLong found himself compelled to abandon the ship in the last extremity, he could reach Plover Bay, or St. Lawrence Bay, or some other point on the Asiatic coast where they would be well cared for by the Tchuktchis. But his experience on this cruise compelled him more than once to state also, that to attain a high latitude with a vessel in that part of the Arctic must be seldom possible. No whaler had ever been known to reach the 74°; and nowhere within the Arctic Circle does the ice remain permanently so far south as *between Wrangell Land and Point Barrow*.

THE SECOND CRUISE OF THE "CORWIN," MAY 4 TO OCT. 20, 1881.*

The instructions of the Secretary of the Treasury for the second cruise of the "Corwin" bore the date of April 21, 1881. The first

* By the courtesy of Major E. W. Clark, Chief of the Revenue Marine Service Treasury Department, the writer has had access to the unpublished official report of this cruise, from the large amount of information supplied by which this narrative is made up.

object set out in these was again the enforcement of the provisions of U. S. Laws, and the protection of the interests of the U. S. Government on the seal islands and sea-otter hunting grounds in Alaskan waters. Additionally the instructions read, "No information having been received concerning the whalers 'Mount Wollaston' and 'Vigilant,' you will bear in mind the instructions for your cruise of last year, and it is hoped you may bring back some tidings of the missing vessels. You will also make careful inquiries in the Arctic regarding the progress and whereabouts of the steamer 'Jeannette,' engaged in making explorations under command of Lieutenant-Commander DeLong, U. S. N., and will, if practicable, communicate with and extend any needed assistance to that vessel. . . . You will in your season's cruise touch at such places as may be practicable on the mainland or islands where there are settlements of natives, and examine into and report upon their condition.

"While cruising in the Arctic Sea you will make careful observations as to currents, tides, etc., and will keep an accurate record of such soundings, surveys, etc., as you may be able to make; and you will obtain such information as may be practicable regarding the numbers, character, occupations, and general condition of the inhabitants of the adjacent coasts. . . . You are permitted in your discretion to remain in the Arctic Ocean as late in the season as may be necessary to accomplish the object of your voyage, without encountering undue hazard to your command."

The senior officers of this cruise were: Captain C. L. Hooper; First Lieutenant, W. J. Herring; Second Lieutenant, E. Burke; Surgeon, Irving C. Rosse; Scientist, Prof. John Muir of California.

May 4, the "Corwin" sailed from San Francisco, accompanied out of the harbor by the revenue steamers "Rush" and "Hartley," and a number of the San Francisco Yacht Fleet. Heavy gales and snow storms were encountered on the 16th, compelling, with the strong current running against the northwest gale, a turn back and run into Beaver Harbor, which affords ample protection, having several good anchorages near the shore. The Onalga Pass between Ounalaska and the Onalga Islands was preferred by Captain Hooper to either the

Oumak or the Akoutan pass, as containing no hidden dangers and safely navigable for all classes of vessels except as when first attempted by the "Corwin" when a strong gale was blowing against the current; it was successfully sailed through on the 17th, and at Ounalaska the oak sheathing of the ship, which had started, was repaired. The ship took in a supply of coal, and purchased from the Alaska Commercial Company nine months' extra provisions.

The natives at Ounalaska were suffering from an epidemic, — pleuropneumonia, — from which a large part of the population had died, and the only physician of the place being dangerously ill, the sick received assistance from the surgeon of the "Corwin." The settlement of Ounalaska or Illialook is the largest commercial port of the Aleutian Islands, and the principal depot of the "Alaska Commercial" and the "Western Fur and Trading" Companies. The town Illialook had before this epidemic, a population of three hundred and forty-eight souls, only eight of whom were Americans; one hundred and eighteen were Creoles, and two hundred and twenty-two Aleuts. There is a resident priest, and a school conducted by one of the church officials, but irregularly attended, nor do the parents care about any instruction in English for their children.

Sailing from Ounalaska May 22, the ship reached St. Paul's the day following, finding there as at Ounalaska that the preceding winter had been mild and the snow light. The thermometer had but once registered below zero. From this point Captain Hooper, remembering the rough experience of his first cruise when trying to make a northing along the east side of Bering Sea, determined to keep if possible to the westward of the pack. On the 24th, in lat. $58^{\circ} 43' N.$, long. $171^{\circ} 26' E.$, the temperature of the water fell to 32° , and ice was sighted from the deck. Finding it so far south, the "Corwin" shaped her course for Cape Thaddeus, Siberia. On the 27th she was at the mouth of Anadir Gulf, the wind blowing hard from the northward with a short heavy sea running; the course was shaped for St. Lawrence Island, which was found covered with snow and almost surrounded by ice. The wretched condition of the inhabitants of this island was first reported by the late Captain George W. Bailey of the revenue steamer "Rush,"

from information received by him at Ounalaska; he was unable to visit them. The fearful decrease of its population has already been named in the first cruise of the "Corwin." The facts now learned of that suffering were still more distressing. Eight hundred had perished. Mr. Nelson now collected one hundred crania for the Smithsonian.

The natives seemed overjoyed at the return of the ship, firing guns, shouting, etc. They came on board in large numbers and reported that the weather during the past winter having been mild, they had experienced no difficulty in supplying themselves with food.

Taking on board two families who desired to reach the Siberian coast, the "Corwin" sailed for Plover Bay, where she first learned from Captain Lapham of the whaling barque "Rainbow," news of the whaling ships, "Mount Wollaston" and "Vigilant," searched for on a former cruise. A report had come from the natives at East Cape and other points along the coasts, that a party of Tchuktchis, whilst sealing on the ice near Cape Serdze-Kamen, had discovered a wreck believed to be one of the whalers. Captain Hooper determined to dispatch a sledge party in that direction to make inquiries for the ships and also for the "Jeannette." Engaging therefore at Marcus Bay for an interpreter, a native who spoke some English, Hooper steamed through the drift-ice and passing Cape Tchaplín, anchored on the 29th on the south side of St. Lawrence Bay. Here an old man gave the most detailed story of the wreck of the "Mount Wollaston," which, however, Hooper was soon led to believe, was almost entirely manufactured for the sake of reward.

"Finding," says the Captain, "that we could get nothing but lies from the St. Lawrence Bay natives, we steered for the Diomedé Islands, where again the natives came on board in large numbers and were very anxious to trade." One called for whiskey, and upon being told that we did not sell whiskey, answered promptly, "I believe you lie." As soon as it became known to them that we wished to purchase dogs, a raid was made on all the aged, female, and useless dogs of every description in the settlement, and boat-load after boat-load arrived until we were almost compelled to use force to stop them from bringing the animals on board. With the interpreter Joe's assistance, who passed

judgment on them by saying, "That dog no good," or, "This good," the required number of the best were selected, and the natives were informed that no more were wanted, and that the rejected ones must be taken out of the ship. This last order Joe proceeded to carry out by picking them up by the back and dropping into the boats without regard to the howls and snarls of the dogs, or the expostulations of their owners. We had succeeded in getting nineteen good dogs with two sleds; paying for all twenty-one sacks of flour. We also bought some fur clothing, boots, and some walrus tusks, paying for them in tobacco and ammunition."

May 31 the "Corwin" made Cape Serdze Kamen, but found a rim of ice from five to thirty feet high, extending from two to three miles off shore. Communicating with some natives who were out on the ice sealing, Hooper engaged one of them to accompany him in quest of further information, and went off with him on his sled to the native settlement. Here "deer-skins were spread on the ground for us to rest on, and a pair of mittens of peculiar make presented to each. We visited several of the houses and were received in a most friendly manner by all their occupants. This settlement is near the wintering-place of the 'Vega' in 1878-9. In one of the houses we were shown a silver fork and spoon which had been presented to one of the old men by Professor Nordenskiöld, for whom they all seemed to entertain a friendly feeling, and who was called by them 'Captain Enshall.'"

June 1, leaving this settlement (*Tapkan*), lat. 69° 28', long. 175° 10' W., Hooper came to solid ice ahead, and on the starboard-bow, showing that he had come to the end of the lead. He was very near being nipped in the rapidly closing ice, which, through the thick snow could be seen no further than the ship's length; shortly after midnight he was entirely surrounded, and in working out by the engine, lost every pintle of the rudder. Caught in the end of a rapidly closing lead, one hundred and twenty miles from open water in a howling gale and without a rudder, destruction at first seemed inevitable, but, after several hours of hard work, steering by the sails, the ship was got into the open lead again and a jury-rudder prepared. Believing that if the northerly wind continued it would be but a few hours before the pack

would rest against the shore, the "Corwin" steamed slowly to the south and east, for, to have been caught between the pack and shore ice would be certain destruction for any vessel, no matter how strongly built. Koliutchin Island was soon seen at the distance of about ten miles, and a consultation with the natives was held which ended in the advice, that the ice was practicable for the sledge party to search for the whalers and the "Jeannette." The native consultation had ended in a grunt, which Joe interpreted, "He think it pretty good."

The search party consisted of First Lieutenant Herring, Third Lieutenant Reynolds, Coxswain Gessler, and two natives; their outfit included twenty-five dogs, four sleds, one skin boat, one tent, one coal-oil stove, and furniture, with five gallons of oil, five skin coats, three pair of skin trousers, six pairs seal-skin boots, two deer-skins, and two rubber blankets, an aneroid barometer, thermometer, marine glass, boat compass, lead, and line, etc., one hatchet, sail needles and twine, fifteen yards cotton canvass, a quantity of seal-skin line for securing loads to the sledges, one hundred and forty pounds of bread, ten pounds of coffee, ten pounds sugar, fifty pounds dried potatoes, eighty pounds of pemmican, three rifles, three revolvers, and a shot gun with an abundance of ammunition.

Instructions were given to Lieutenant Herring to proceed along the coast as far as practicable, communicating with the natives at each settlement, and if possible to find the parties who were said to have discovered the wrecks, and gather all facts in connection with it that could in any way throw light on the fate of the missing whalers or the "Jeannette." The party was to return to the "Corwin" at Cape Serdze Kamen.

Seeing them fairly started, the "Corwin" was headed south for Plover Bay, Siberia, to repair the rudder. After visiting St. Michael's, Norton Sound, Captain Hooper returned to Cape Serdze, and took the land excursionists on board. They had been absent twenty-eight days, and had been along the Asiatic coast to a place called Cape Wankeram, where they found parties who had boarded the wreck, and obtained from them a number of articles taken from it, which were afterward identified at San Francisco as belonging, some to the missing

whaling bark "Vigilant," and others to Captain Nye, of the "Mount Wollaston." It would seem that both crews had been on board the "Vigilant." It is not unlikely that both vessels being caught, it was decided by their captains, who were skilful sailors and men of great courage and energy, to unite their forces on the best vessel, and that a subsequent break-up of the ice released it, and enabled them to reach some point near where the wreck was discovered before again becoming embayed and lost.

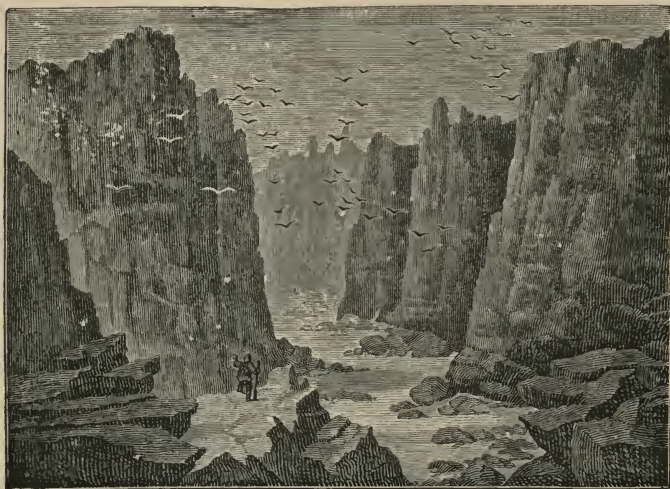
The statement made by the natives, was that they were out sealing on the ice, when, seeing a dark object, they approached it, and it was found to be the hull of a vessel, with mast, bulwarks, and boats gone, and the hold partly filled with water. In the cabin were four corpses, three on the floor and one in a berth. After taking what they could carry home, night coming on, they left the wreck, with the intention of returning in the morning; but during the night, the wind which had been from the northward, changed to southwest, and the wreck was not seen again, having drifted away or sunk.

The sledge parties had also met travelling parties of Tchuktehis from the vicinity of Cape Yukon, on their way to East Cape, and from them learned that no white men had been seen on the coast. These people are constantly travelling back and forth, and it would be almost impossible for any one landing on the coast to escape their notice

LANDING ON HERALD ISLAND.

July 30, Herald Island was sighted; as the "Corwin" approached, the ice became very much heavier, and the difficulty of getting through it much greater, but after a good deal of bumping, squeezing, and twisting around through narrow crooked leads, and occasionally charging through an icy barrier, she succeeded in reaching the island at 9.45 P. M., and made fast to the ground ice in ten fathoms of water, not more than a cable's length from the shore. This was an improvement on the four attempts of her first cruise, when she failed to get nearer than four miles. The exploration now made is also the first in the history of this island. Captain Kellett, R. N., of the "Herald," the

relief ship for Franklin, described it as an inaccessible rock. The American party were eager to land as explorers. As soon as the vessel was made fast, a general rush was made for the shore, each trying to be the first to land. The rim of ice was probably one thousand feet in width, and full of hollows and hummocks, but after many falls, with some narrow escapes from going into the deep crevices which run through it in various directions, the shore was reached, and a general scramble up the almost perpendicular rocks followed. While this was



AN ARCTIC RAVINE.

being done, Professor Muir, an experienced mountaineer, came over the ice with an axe in his hand, and reaching the island a few hundred feet further north, opposite a bank of frozen snow and ice one hundred feet high and standing at an angle of fifty degrees, deliberately commenced cutting steps, and ascended the ice cliff, the top of which he soon reached without apparent difficulty; and from this the summit of the island was gained by a gradual ascent neither difficult nor dangerous. Muir's practised eye had selected the most suitable place for the ascent before the ship had been made fast.

Another party making the attempt for an ascent through a small steep ravine up which they climbed, succeeded after several narrow escapes from falling rocks, in reaching the top of the ravine, but then

found that their ascent was scarcely begun, for above them, was a plain surface of nearly a thousand feet high, and so steep that the rock which covered it, at the slightest touch came thundering to the bottom. Hooper had now to interpose his authority, and order a retreat for the safety of this party whose descent was made, one at a time, the upper ones remaining quiet till the lower ones were out of danger.

The top of the island, ordinarily inaccessible, under the skilful guidance of Professor Muir, had been thus reached by a large party, and everywhere carefully searched for traces of the "Jeannette" and missing whalers. All prominent points were carefully examined for cairns, but none were found, or anything which would indicate that the island had ever before been visited by human beings.

While the search was being prosecuted by the officers and men from the ship, Professor Muir made a collection of plants, studied the geological character of the island, and made sketches; Mr. Nelson devoted himself to its natural history.

The Report of the Smithsonian for 1881 says: "In summing up the direct results of Mr. Nelson's work in the North, the unbroken series of about twelve thousand meteorological observations must be mentioned first, since to obtain these was the primary object of his residence there. In addition to these there were obtained about nine thousand ethnological specimens, two thousand one hundred bird skins, five hundred mammal skins and skulls, four hundred fishes, and various other specimens, beside vocabularies of seven or eight Eskimo dialects with accompanying linguistic notes, and a large amount of manuscript material upon all the branches in which collections were made. Over one hundred photographs of the people and other scenes were secured during the last year of his residence in the north. The necessary expenses attending this work, outside those appertaining strictly to the meteorological work, were met by an allowance from the Institution, where the specimens are stored at present awaiting the elaboration of the Reports."

Up to the year 1870, the most extensive and valuable herbarium

at the Smithsonian had been the collection of plants made during the North Pacific Exploring Expedition, under command of Commanders Ringgold and Rodgers (1853 to 1856), by Mr. Charles Wright, an accomplished botanist. The collections in every branch of natural history, botany, etc., have been of late years largely extended by such explorers as Dall and Nelson. (See Smithsonian Reports.)

Notwithstanding the bleak and barren appearance of the island, at a distance of a few miles on its summit were found a number of species of plants, while every rocky projection on the cliffs seemed covered with nesting birds, gulls, etc.; on the summit snow buntings were flying merrily from rock to rock.

On the top of the east end, over a thousand feet above the sea, was a bed of turfy moss about one hundred yards in extent, and from three to four feet in depth, containing a number of holes, which at first resembled the tracks of some hoofed animal, but which upon closer examination proved to be burrows of the white fox.

"The entire island is a mass of granite, with the exception of a patch of metamorphic slate near the centre, and no doubt owes its existence, with so considerable a height, to the superior resistance this granite offers to the degrading action of the northern ice sheet, traces of which are plainly shown. Standing as it does alone out on the Polar Sea, it is a fine glacial monument. The island is about six miles long by two wide; its greatest height as shown by an accurately tested barometer is one thousand two hundred feet."

From the summit a good view was offered of Wrangell Land, the magnetic bearing of its extremity being given by Professor Muir as south 40° ; west and south 70° ; west or south $62^{\circ} 26'$; west and north $86^{\circ} 34'$ N. (true). The contour of the eastern end of the land was clearly defined as about forty miles distant, but further away, on its north side a blue line appeared above the horizon which Muir supposed to be land extending in that direction. To the party who reached the summit all sense of fatigue vanished, for the midnight sun was shining with gleaming splendor, coloring all the waste of the ice, sea, and granite. "The hour," says Muir, "which I spent alone was one of the most impressive of my life, and I would fain have watched here all the strange night,

but under the Captain's charge, hastened to begin my return journey at one in the morning, after taking the compass bearings of the principal points within sight on Wrangell Land."

While the exploration on the island was going on, the "Corwin" steamed around to the north side in a clear lead between the grounded and the drift ice, and made an examination of the shore line. At 2.30 A. M. all hands having returned to the vessel, she cast off from the ground-ice and steamed through the drift, toward clear water, which was reached about 6.30 A. M. The "Corwin" was also the first to land here; the first of explorers to approach, indeed, very near this island, the bearings of which were afterward so fully determined by Lieutenant Berry, U. S. N., of the "Rodgers." The fact of its being an island of small extent has an important relation to our knowledge of the ice barriers; the harbor, of which mention will be hereafter made, may prove a refuge to the whalers; but possibly, a temptation to some to remain too long in the Arctic.

EARLY NOTES OF WRANGELL LAND.

The first notice of this land has already been adverted to in the account of the Exploring Expedition of Lieutenant (late Admiral) Rodgers, U. S. N., 1855. In the "Reported Dangers of the Pacific Ocean," compiled by Mr. E. R. Knorr of the U. S. Hydrographic Office, will be found the following notice:—

"The existence of extensive land northwest of Bering's Straits, which had been reported forty years ago by the Tehuktchis of Cape Jakan to Lieutenant (now Admiral) Wrangell of the Russian Navy, has been placed beyond doubt by the recent discoveries of Captain Long and Captain Raynor. It is very important in the interest of whalers as well as for the promotion of geographical knowledge to obtain all the information of it which fair opportunity (so rare in that latitude) may place within the reach of whaling-masters when near that ground.

"Captain (now Admiral) Kellett, of H. B. M.'s ship 'Herald,' when in search for Sir John Franklin in 1849, discovered, and landed on Herald Island, and cruising in that vicinity for a few days in very rough

weather, believed he saw another island, named by him Plover, and also more extensive land which he thought to be the land reported by Admiral Wrangell.

“Lieutenant (now Rear-Admiral) John Rodgers, U. S. N., while commanding the U. S. North Pacific Survey Expedition in 1855, endeavored, in the flag-ship ‘Vincennes,’ to verify these discoveries; he also landed on Herald Island (the southeast end of which was found to be in lat. $71^{\circ} 21' N.$, and long. $175^{\circ} 39' W.$), and evidently penetrated further to the northward and to the westward than Admiral Kellett had done, but, although favored most of the time by beautifully clear weather, he could not see any land or any appearance of land, except Herald Island. The land enumerated then shown on the British charts (but now omitted) was conclusively proved not to exist, as the ‘Vincennes’ anchored over night in lat. $72^{\circ} 02' 27''$, long. $174^{\circ} 37' W.$, where, on the following morning, with a horizon clear for a radius of at least thirty miles, no land was in sight. To the west of Herald Island, the progress of the ‘Vincennes’ was barred by field ice when about seven miles from the position assigned to Plover Island, which surely would have been seen if existing. Subsequently the position of Wrangell Land was approached from the southeast to within a few miles, when again an impenetrable barrier of packed ice was met with; very thick weather also had set in, in the meantime, which prevailed for more than a week, thus preventing the discoveries which twelve years afterward were made but thirty miles north of the ‘Vincennes’ track.”

THE FIRST AUTHENTIC ACCOUNT.

Captain Long, of the whaling barque “Nile,” in 1867 gave the first authentic account of the land in question. After making its southwest point in long. $178^{\circ} 30' E.$, he sailed along the south coast for two days, until he made what he believed to be the southeast point in lat. $70^{\circ} 40' N.$, and long. $178^{\circ} 57' W.$, when he turned south toward the straits. But Captain Raynor of the “Reindeer” having also fallen in with that land at nearly the same time, and placed the southwest point in lat. $70^{\circ} 50' N.$, and long. $178^{\circ} 15' E.$, states the southeast point to be

in lat. $71^{\circ} 10' N.$, and long. $176^{\circ} 40' W.$ (more than two degrees further east-northeast than Long's position) from whence, he says, the coast turns first northwestward for fifteen or twenty miles, then northeast, and higher up apparently northeastward. The southeast point of Captain Long, named by him Cape Hawaii, therefore is, in all probability, the south point, from which the land bends to northward and then again eastward to the southeast point of Captain Raynor, from whence it turns to the mountains which are shown on the charts as seen from the "Herald." Captain Bliven, of the "Nautilus," reports to have seen land to the northeast of Herald Island as high as lat. $72^{\circ} 00' N.$ The land, according to Captain Long's description, presents the features of the opposite Asiatic coast. Table mountains separated by valleys, ascend directly from the shore to a considerable elevation; the middle one, apparently, a volcano, he estimated to be two thousand four hundred and eighty feet high; he believes he had seen verdure and a large black place on the slope of one of the hills resembling coal; and he concludes that the land is inhabited, or that at least reindeer may be found there. Captain Raynor, on the contrary, states that to him the coast, which was nearly straight, with high, rugged cliffs, appeared to be entirely barren.

The full report of Captains Long and Raynor first appeared in the "Honolulu Commercial Advertiser" in November, 1867. It is here given to the credit of our Merchant Marine. The "Advertiser" says: "One of the most interesting items that we have learned from the whalers who have cruised in the Arctic Ocean the past summer is the discovery of extensive land in the middle of that ocean, which may yet prove to be a Polar continent. The existence of this land has long been known, but owing to the impassable ice barred along its shores, of its extent and character nothing very definite has been known until this season. Baron Wrangell, the famous Russian explorer, first communicated to the world the knowledge of its existence as he learned it from the Siberian Indians, and it is simply marked on most Arctic charts 'extensive highland.'

"It should be stated that the past summer has been the mildest and most favorable for whaling ever known by oldest whalers. One

master says that he did not see a piece of ice as large as his hand till he reached the straits, and even beyond that, up to 72° , the sea was generally free from floating ice. The weather, for the most part, has been exceedingly mild, with southerly winds prevailing, which has tended to melt the ice or drive it northward. As a result of the favorable state of the ocean and weather, the ships have gone further north this summer than ever before, some having reached as high as lat. $73^{\circ} 30'$.

“Captain Long, of the barque ‘Nile,’ who seems to have examined the land most attentively, having cruised along the entire southern coast, has drawn a sketch of its appearance. It is quite elevated and near the centre has an extinct crater cone which he estimated to be two thousand four hundred and eighty feet high. He named it Wrangell’s Land, after the noted Russian explorer. The west point he named Cape Thomas; the southwest point Cape Hawaii. The names given by Captain Long are so very appropriate that we doubt not Geographical Societies of Europe and America will adopt them, and call this land Wrangell Land. Captain Long has prepared for us an account of this interesting discovery, which we insert here:—

“HONOLULU, Nov. 5, 1867.

“SIR: During my cruise in the Arctic Ocean I saw land not laid down on any chart that I have seen. This land was first seen from the barque ‘Nile,’ on the evening of the 14th of August, and the next day at 9.30 A.M., the ship was eighteen miles distant from the west point. I had good observations this day, and made the west point to be in lat. $70^{\circ} 46' N.$, and long. $178^{\circ} 30' E.$ The lower part of the land was entirely free from snow and had a green appearance, as if covered with vegetation. There was broken ice between the ship and land, but as there was no indication of whales, I did not feel justified in endeavoring to work through it and reach the shores, which I think could have been done without much danger. We sailed to the eastward along the land during the 15th, and part of the 16th, and in some places approached it as near as fifteen miles.

“On the 16th the weather was very clear and pleasant, and we had a good view of the middle and eastern portion. Near the centre or

about in long. 180° , there is a mountain which has the appearance of an extinct volcano. By approximate measurement I found it to be two thousand four hundred and eighty feet high. I had excellent observations on the 16th, and made the southeastern cape, which I have named Cape Hawaii, to be in lat. $70^{\circ} 40'$ N., and long. $178^{\circ} 51'$ W. It is impossible to tell how far this land extends northward, but as far as the eye could reach we could see ranges of mountains until they were lost in the distance; and I learn from Captain Bliven of the ship "Nautilus," that he saw land northwest of Herald Island, as far north as lat. 72° .

"From the appearance of the land as we saw it, I feel convinced that it is inhabited, as there were large numbers of walrus in this vicinity; and the land appeared more green than the main coast of Asia, and quite as capable of supporting man as the coast from Point Barrow to the Mackenzie River, or the northern parts of Greenland, which are in a much higher latitude. There is a cape a little to the westward of Cape Jakan which has a very singular appearance. On the summit and along the slopes of this promontory there is an immense number of upright and prostrate columns—some having the appearance of pyramids, others like obelisks; some of them with the summit larger than the base. The character of the surrounding country, which was rolling with no abrupt declivities, made these objects appear more singular. They were not in one continuous mass but scattered over a large surface, and in clusters of fifteen or twenty yards with intervals of several hundred yards between them. While at anchor near this place, Captain Phillips, of the 'Monticello,' came on board and drew my attention to a large black place on the slope of one of the hills, and said he thought it was coal. We examined it with the telescope, and it had a very distinct appearance of coal. It glistened in the sun and appeared like a large surface which had been used as a deposit for coal. It was about one and a half miles in length, and one half mile in breadth, the country surrounding it being covered with vegetation. From 175° to 170° east there were no indications of animal life in the water. We saw no seals, walrus, whales, or animalculæ in the water. It appeared almost as blue as it does in the middle of the Pacific Ocean, although there was but from fifteen to eighteen fathoms in any place.

within forty miles of the land. I think the position I have assigned to this land will be found correct, as Mr. Flitner examined my chronometer on my arrival and found it only one and a half miles in error.

"I have named this northern land Wrangell Land as an appropriate tribute to the memory of a man who spent three consecutive years north of lat. 69° , and demonstrated the problem of this open Polar Sea forty-five years ago, although others of much later date have endeavored to claim the merit of this discovery. The west cape of this land I have named Cape Thomas, from the man who first reported the land from the masthead of my ship, and the southeastern cape I have named after the largest island in this group. As this report has been hurriedly prepared, I would wish to make more extended observations on the subject, which may be of benefit to other cruisers in this direction, if you will allow me room in your paper on some future occasion.

"Yours very truly,

"THOMAS LONG."

The "Advertiser" observes: "The next interesting inquiry relates to its extent. As near as we can learn, after diligent inquiry no one landed anywhere on it, though several coasted within a few miles of it. The southern shore runs a distance of about one hundred miles east and west. How far it extends north is at present only a matter of conjecture.

"Captain Bliven, while cruising near Herald Island, lat. $71^{\circ} 20' N.$, long. $175^{\circ} W.$, and distant about eighty miles from the southeast point of Wrangell Land, saw the mountain range extending to the northwest as far as the eye could reach. He thinks it not improbable that it extends north several hundred miles. If so, it would appear to be of great extent, perhaps sufficient to be termed a continent. By taking a chart of the Arctic Ocean, and marking the land from the points named above, it will be found to be about seventy miles from the Siberian coast. The straits between the two shores are usually blocked with ice, but this season they have been quite clear. Captain Long thinks that a propeller might readily have steamed far up north either on the west or east side of this land, and made full discoveries regarding its extent and character.

"The following letter from Captain Raynor contains some additional particulars relating to the northerly current past Herald Island, a circumstance noticed by several masters, and which tends to confirm the opinion that the newly discovered land extends some distance to the north. In the channel north of Herald Island the sea was clear of ice as far north as the eye could reach from the vessel that went furthest into it."

RAYNOR'S LETTER.

"HONOLULU, Nov. 1, 1867.

"MR. WHITNEY,

"SIR: In compliance with your request, I send a short account of a large tract of land, lying in the midst of the Arctic Ocean, hitherto but little known. This land has heretofore been considered to be two islands, one of which is marked on the English charts as Plover Island, which is laid down to the west-southwest of Herald Island. The other is simply marked 'extensive land with high peaks.' On my last cruise I sailed along on the south and east side of this island for a considerable distance three different times, and once cruised along the entire shore, and by what I considered reliable observations, made the extreme southwest cape to lie in north lat. $70^{\circ} 50'$, and east long. $178^{\circ} 10'$. The southeast cape I found to be in north lat. $71^{\circ} 10'$, and west long. $176^{\circ} 46'$. The south coast appears to be nearly straight, with high, rugged cliffs, and entirely barren. The northeast coast I have not examined to any extent, but it appears to run from the southeast cape for twenty miles, and then turns to the north and northeast. I learned from Captain Bliven that he had traced it much further north, and has seen others who traced it to north of lat. 72° . I think there is no doubt that it extends much further to the north, and that there is another island to the east of it, say in long. 170° west and to the northwest of Point Barrow, with a passage between it and the land I have just described. My reason for thinking so is this: we always find ice to the south of the known land further to the south than we do to the eastward of it. The current runs to the northwest from one to three knots an hour.

"In the longitude of 170° west, we always find the ice barrier from fifty to eighty miles further south than we do between that and Herald

Island, and there is always a strong current setting to the northwest between these localities, unless prevented by strong northerly gales (for in such shoal water as the Arctic Ocean, the currents are changed easily by the winds) which would indicate that there is a passage in that direction, where the waters pass between two bodies of land that hold the ice, the one known, and the other unknown.

I would add that the southwest cape of this island described above, lies seventy-five miles distant from the Asiatic or Siberian coast.

“Yours very truly,

“GEORGE W. RAYNOR,

“*Master of ship ‘Reindeer.’*”

The land thus referred to was now first reached and explored by the U. S. Revenue Cutter “Corwin,” August 11. The atmosphere was perfectly clear, and the land in plain sight about thirty miles distant, covering an arc of the horizon from northwest to north-northeast true. Sketches and bearings of prominent points were taken, but the first attempt at a nearer approach was unsuccessful. “Good observations for latitude and longitude, confirmed by subsequent bearings and observations taken off the east coast, showed the land on the American Hydrographic Chart to be laid down eighteen miles too far south, although the general trend of the coast is very nearly correct.

“NEW COLUMBIA.”

A volunteer party consisting of the Lieutenant, the Professor, Assistant Engineer Owens, Mr. Nelson, the botanist, and the Coxswain, Gessler, now eagerly volunteered to land, but the fog and mist rapidly shutting down, and the uncertainty of the ship holding her position in the lead kept them back until the following day, when at 7.30 A. M. anchor was dropped within a cable's length of the land in five fathoms of water. A landing was then effected, and the American flag raised in token of possession and ownership by the United States of America under the name of “New Columbia.” The island had heretofore appeared on some charts as Wrangell Land, and on others as Kellett



WRANGELL LAND AS SEEN SEPT. 11, 1880.

From a sketch by Captain C. L. Hooper.

Land. The point of landing was at the most eastern part of the island; it was the spot most likely to be reached by any one trying to make a landing on that coast, forty-five miles from Herald Island. In clear weather it is in plain sight.

The river where the "Corwin" anchored, lat. $71^{\circ} 04'$, long. $177^{\circ} 40'$ W., was named Clark River, in honor of Major E. W. Clark, the chief of the U.S. Revenue Marine. It was about one hundred yards wide, and deep and rapid, and from the top of the cliffs near by, it could be seen extending back into the mountains a distance of forty miles. The mountains devoid of snow, and seen under very favorable circumstances through a rift in the clouds, appeared brown and naked.

The stay on shore was necessarily short on account of the strong northerly current which was sweeping the ice pack along with irresistible force. At 9.30 A. M., being unable to hold her position any longer, the ship commenced to work out toward the lead which was reached at 11 A. M. "We examined the shore line with our glasses while approaching and leaving the land north and south, and saw nothing but perpendicular hills of slate from one to three hundred feet high, the sloping bank of the river being the only place for miles where a party travelling over the ice would be able to effect a landing.

"No time had been lost in sending out parties to examine the shore line, and all prominent points, while the more distant ones were carefully scanned with the glasses for signs of human life, past or present, but nothing was seen."

Captain Hooper says: "This is undoubtedly the part of the land seen by Captain Kellett, R. N., in 1849, when he discovered and landed on Herald Island, and which since appeared on the British Admiralty charts as *Plover* Island, although erroneously laid down somewhat further to the eastward. We now know that *Plover* Island has no separate existence, and that what Kellett saw was the main island."

In reference to the name of "New Columbia," "it was suggested by the name previously given to the islands further west — 'New Siberia,' and it was believed that the bearing of two names was calculated to create confusion, and that the newly appropriated name being of a

national character would imply no disrespect to the memory or give offence to the gallant officers whose names it bore, but who had not landed on it." The terms of the Treaty of 1869 between the United States and Russia would seem to debar possession by the United States of these barren islands; the question, involving the right of discovery, has not, as yet, been mooted between the two Governments.

WRANGELL LAND AN ISLAND.

The discovery that it is an island of limited extent is to be accredited to Commander DeLong, who drifted in the "Jeannette" in the winter of 1879-80 across the meridians embraced within its extremes, and in plain sight. It will probably occur to the reader that the early reports by Long and Raynor, as well as those of Kellett, were largely the foundation of the hope of finding it a continent.

From this first exploration of Wrangell Land, Captain Hooper crossed over to Point Barrow, where he found a part of the crew of the whaler "Daniel Webster," whose Captain, not having been familiar with Arctic navigation, had remained in a lead just half an hour, long enough to have his ship crushed. Nine of the crew who had escaped to the shore were taken aboard the "Corwin," others having gone overland to Icy Cape.

August 24, the cutter had again made a distance of six hundred miles, arriving in Plover Bay where was found the "Golden Fleece," with Lieutenant Ray of the U. S. A. Signal Service, on his way to establish a meteorological station at Point Barrow.

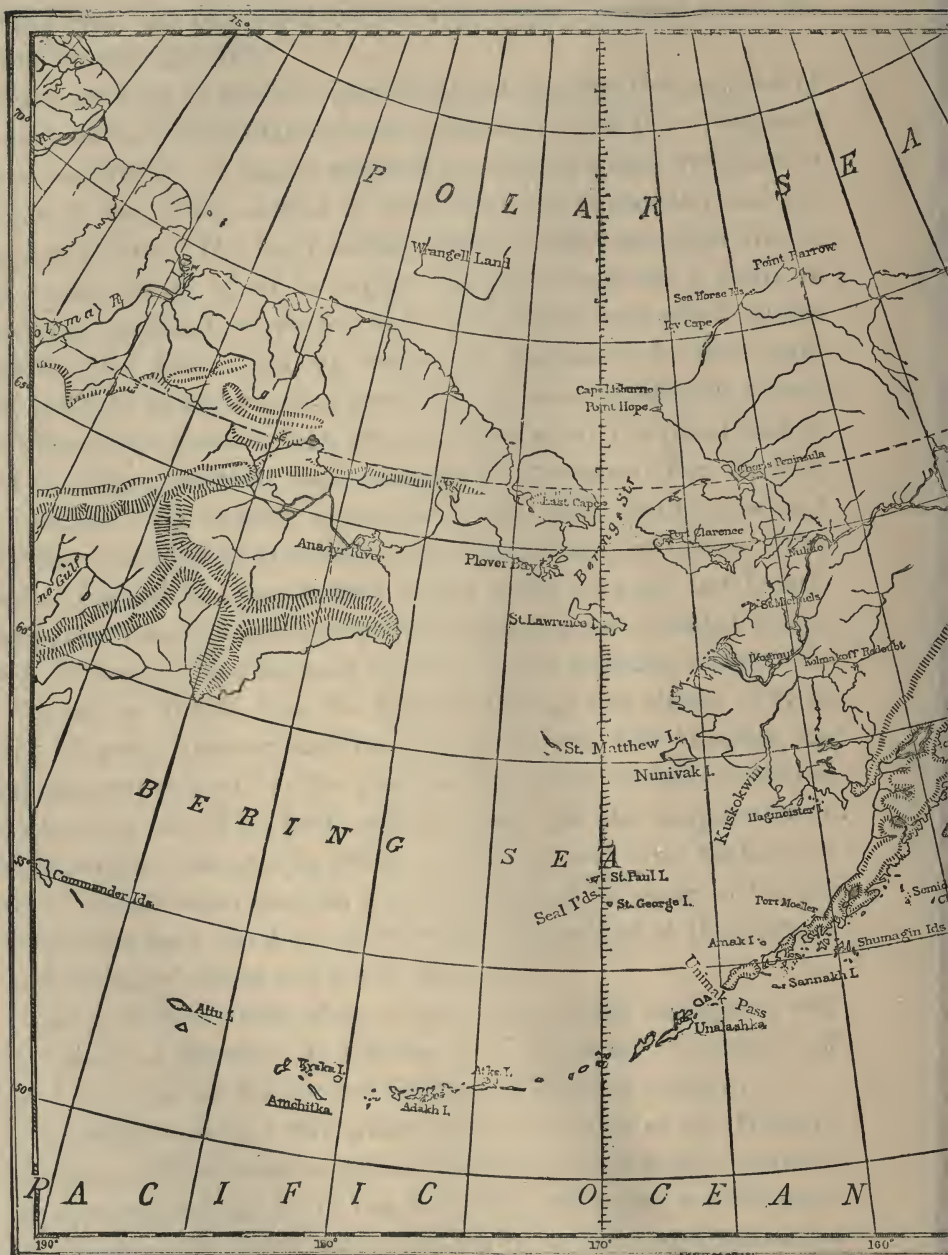
On the 27th the "Corwin" sailed to the northward, and soon after again sighted the blue peaks of Wrangell Land, standing along the ice pack from which she neared Herald Island, but in a fierce gale that lasted several days, lost her iron ice-breaker, and, as the oak sheathing which had protected the soft Oregon plank around her bows, was also entirely gone, the Captain could not again venture into the ice. After cruising eastward into the vicinity of Kotzebue Sound and Hotham Inlet, and at St. Michael's, receiving on board a second party of ship-

wrecked men, the cutter was on her way to San Francisco where she arrived October 21, 1881.

When drawing up his full report of this cruise, after the reception of the news in the United States of the "Jeannette" and the "Rodgers," Hooper concludes: "I cannot refrain from making a brief reference to the fate of one of the objects of our search, the 'Jeannette,' and her officers and crew. The heart-rending details of that sad affair are too fresh in the minds of all to require repetition here, but I desire to express my profound sorrow for their misfortunes, over which all the civilized world grieves, and my unbounded admiration for their fortitude, and their heroic exertions in making the most remarkable retreat over the ice ever made by man, from the place where the vessel sank to the Lena Delta; for their brave struggle for existence after reaching the land, and their cheerful resignation to fate when death in its most awful form stared them in the face and claimed them one by one. The diary of Captain DeLong, written almost as he drew his last breath, relates acts of heroism and self-sacrifice which are not excelled in the annals of history. Not the least of them was the devotion of the faithful Alexai, an Innuited from St. Michael's, going out almost daily in search of game, freezing and starving as he was, but bringing the small amount secured to the commanding officer to be distributed fairly to every one of the party, and at night, with the temperature at zero, or perhaps lower, taking off his seal-skin robe to cover his beloved captain. Surely when the final summing-up shall be made in the list of heroes who have laid down their lives for the benefit of their fellow-men, the name of *Alexai* will not be forgotten."

Captain Hooper refers also in like terms to the courageous and noble efforts of Master C. F. Putnam, U. S. N., of the "Rodgers," of whose loss on the ice floe the sad intelligence had been received.

The official report of this cruise, still on the files of the Treasury Department, will be found to embrace discussions on several topics, such as the currents and the ice of the Arctic Sea, the habits and character of the Innuits, and others within the general tenor of his instructions but outside of the narrative furnished by the ship's log. Some points were visited not heretofore described by any other Arctic navigator.





As an additional illustration of the utter uncertainty of ice-navigation in the Arctic Seas and of the currents therein, it may be here mentioned that in his preliminary report of the cruise made up before receiving news of the "Jeannette," he had stated his own conclusions while in the "Arctic," that the ill-fated ship had probably drifted to the northeast, and recommended that a vessel be sent to Melville Island, and another to Prince Patrick Land for her relief; but it will be remembered in this connection how early in the voyage of the "Jeannette," DeLong was compelled to record his abandonment of the hope of his being carried northeast, and his entire submission to the facts, against all theories, that the Arctic currents are the results of local prevailing winds only. Of this, Captain Hooper also states his own like experience during these two cruises, in which he sailed over twelve thousand miles, making thorough search of both the American and Asiatic shores, for tidings of the lost whalers and the exploring steamer "Jeannette."

CRUISE OF THE U. S. S. "RODGERS."

The Spring of 1881 brought no further news of the "Jeannette." The United States Congress received a number of petitions, asking that the Navy Department should send out a relief ship, and President Garfield was forcibly addressed for the same object by the President of the American Geographical Society, Hon. Judge C. P. Daly of New York. In the Act making an appropriation for the Civil expenses of the Government, approved March 3, 1881, the sum of \$175,000 was appropriated "to enable the Secretary of the Navy immediately to charter or purchase, equip and supply a vessel for the prosecution of a search for the steamer 'Jeannette,' and such other vessels as might be found to need assistance during said cruise; provided that the vessel be wholly manned by volunteers from the navy." This last clause as appears by a letter from the late Commodore Jeffers, Chief of the Bureau of Ordnance, was designed by Congress to emphasize its view that the new expedition should have no other object than to search for, and if necessary, relieve the missing party; it was not to winter in the ice unless unavoidable. The cruise of the "Rodgers" was thus limited.

The first duty devolved upon Secretary Hunt was to obtain a suitable vessel, and equip and dispatch her to the Arctic regions in season to prosecute a search before severe winter should set in. There was no time left to charter or purchase and send round a vessel from the Atlantic coast, but the Department succeeded in finding at San Francisco the "Mary and Helen," already named in the cruise of the "Corwin," a new and strong Arctic Steam Whaler. She was purchased for the sum of \$100,000. The ship had been built specially for Arctic navigation, was fast under canvas, with a speed of eight knots under steam; the propeller was not made to hoist, or the rudder to be readily unshipped, but these parts were specially strong.

March 12, 1881, the Secretary ordered a board of Naval officers to discuss and report upon the direction of the Search Expedition, the best means adapted to it, and its details. The board was composed of the late Rear Admiral John Rodgers, whose Arctic expedition north of Bering Strait has been narrated; Captain J. A. Greer, Lieutenant Commander H. C. White, and Lieutenant R. M. Berry, officers of the "Tigress" in the search for Captain Hall; Lieutenant W. P. Randall; Paymaster A. S. Kenny; Surgeon J. S. Kidder. Convened at the Navy Department, March 14, the Board made a thorough investigation, discussing, with the help of many persons who had been engaged in the whaling service and of other experts on Arctic subjects, the whole subject committed to them, and submitting a full report March 26, (Report of Secretary of Navy, November 28, 1881.)

The chief points of this paper as regards the search were, that as the purpose of Captain DeLong had been clearly expressed to land at Herald Island and Wrangell Land and leave cairns on each, and as the Arctic Sea is too vast to be explored with any rational hope of success in finding the vessels except on some definite information, the missing explorers should be sought for at the points named; not, however, with the clear expectation of finding the cairns, but with the possibility of rescuing lost crews. The Board added a suggestion for a search on the north east Asiatic coast, citing from a letter from DeLong, dated July 17, 1879, that, in event of disaster to the ship, he would retreat on the Siberian settlements to the natives around East Cape, and wait for a chance to get

back to St. Michael's. Their opinion of the unlikelihood of cairns being found on the islands named, was founded chiefly on the testimony of Captain Bernard Cogan, an experienced master of a whaling ship, who explicitly stated that on the 4th of September, 1879, when the ice was seen by him rising ten or twelve feet out of the water, its estimated thickness one hundred feet, hummocky and thus showing that the currents were powerful, the "Jeannette" steamed right into the pack, and was seen enclosed in it and going out of sight with it. The testimony furnished by Professor C. Abbé and Lieutenant A. W. Greely of the Signal Service was to the point that the winter of 1879-80 was one of unusual severity, the natives reporting that no winter of such severity had ever been known by them. The mean temperature north of Bering Strait reported by the officers of the Signal Service at St. Michael's was for the months of January and February, on an average thirteen degrees below zero. The winds in that region were between west, southwest and north-northwest, and the average would be very near west-northwest—a remarkable contrast with the actual experience of the average east-southeast and southeast winds of the "Jeannette." Professor Dall, of the United States Coast Survey, whose opinion in regard to the currents of the Bering Strait and the Arctic Sea has been heretofore quoted, stated that on his previous visit to that region in one of the vessels of the Coast Survey he had expected to find a permanent current setting northward during the summer through the strait, but his observations showed that the current varied with the tides; that the tides were irregular, causing irregular currents, the warm water passing through the strait seeming to divide into three branches, one going westward, another to the northwest, and a third to the northeast; this being indicated more by the melting of ice than by the strength of current. Whaling ships are lost in the Arctic every season; two chief losses being that of thirty-three at one time, and thirteen at another, within the last ten years. The whole shore at Point Belcher is covered with wreckage for miles and miles.

The examination of other experts by the Board were chiefly as in the case of Mr. Kennan, Arctic Explorer of Washington, D. C., on the points of sledge travel, aid from the natives of the Arctic shores, and other like topics.

May 20, Secretary Hunt instructed Lieutenant Berry, who had been placed in command of the "Helen and Mary," now named the "Rodgers," in compliment to the President of the Naval Board, that he should sail as soon as the ship was fully ready, and pursue, as nearly as practicable, the course recommended. The Secretary closed his letter with the words, "The eyes of your fellow-countrymen, of the scientific men of all the world, and especially those interested in Arctic Exploration, will follow you anxiously on your way through the unknown seas to which you go. May Heaven guard and bless you and your officers and men, and crown your heroism with success and glory."

The "Rodgers" was commissioned on the 30th of the month, and in all the departments of the Navy Yard at Mare Island, Cal., was completed ready for sea. She was reported by the Commandant of the Yard, Commodore T. S. Phelps, as thoroughly strengthened, her machinery thoroughly overhauled and put in order, and her engines and appliances found entirely satisfactory on their trial under steam. In addition to the very large amount of stores and pemmican purchased from the remainder of the "Jeannette" Search Expedition appropriation, the ship had received three years' full Navy rations, the supply on board being considered ample for thirty-five officers and men for five years. The commandant further reported that in the "Rodgers'" fitness for the Arctic cruise, she had never been surpassed or perhaps equalled by any vessel equipped for the Arctic Regions. The ship sailed from San Francisco, June 16, with a complement of officers, all of whom were volunteers,* viz.: Masters H. S. Waring and C. F. Putnam, En-

* Officers' Naval Record:—

Lieutenant Robert M. Berry, Commanding. Acting-Midshipman, Jan. 31, 1862; graduated, June 1, 1866; Ensign, March 12, 1868; Master, March 26, 1869; Lieutenant, March 21, 1870.

Howard S. Waring, Executive Officer and Navigator. Midshipman, June 26, 1867; graduated, June 1, 1872; Ensign, July 5, 1873; Master (Junior Lieutenant), July 12, 1878.

Charles F. Putnam. Midshipman, June 24, 1869; graduated, May 31, 1873; Ensign, July 16, 1874; Master (Junior Lieutenant), March 12, 1880; lost on the ice of St. Lawrence Bay in endeavoring to render aid to his shipwrecked comrades, Jan. 11, 1882.

Henry J. Hunt. Midshipman, June 23, 1870; graduated, June 21, 1875; Ensign, Sept. 30, 1876; Lieutenant (Junior grade), March 11, 1883.

signs H. J. Hunt and G. M. Stoney, Surgeons M. D. Jones and J. D. Castillo, Engineer A. V. Zane, and Pay Clerk W. H. Gilder formerly of the Schwatka Expedition. Of the volunteer crew numbering twenty-six, selected with great care, F. F. Melm had also been with Lieutenant Schwatka. The ship arrived at Petropaulovski in thirty-three days, and found in port the Russian corvette "Streloch" with instructions from her Government to offer any needed assistance. At St. Lawrence Bay, Berry took on board two Tchukchis as hunters and dog drivers, and August 20, entered the Arctic Ocean; thence touching at Cape Serdze, and learning there that the "Corwin" had already visited the point, he headed for Herald Island, and made a partial search there for tidings of the missing whalers, the boat party being compelled by the surf to return to the ship.

The "Rodgers" next succeeded in dropping anchor in six fathoms of water about half a mile from shore on the southern coast of Wrangell Land west of Cape Hawaii, and finding a small harbor at the mouth of the lagoon, was moved in. Three search parties were then organized for traces of the missing explorers, one under Master S. H. Waring and Surgeon Castillo, a second under Ensign Hunt and Engineer Zane, the third under Captain Berry, accompanied by Surgeon Jones. The first party found a cairn in which Surgeon Rosse of the "Corwin" had left a dispatch August 12; bringing it on board they left a copy in the cairn. The boat of this party was imprisoned by the pack, compelling them to return to the ship across the ice; it was recovered afterward outside of the bay to which it had been carried by the ice-drift. The second party skirted the coast to the southward, westward, and northward, while the third under Berry penetrated the interior twenty miles in a northwest by north direction. Berry ascended a mountain near the centre of the island, one peak of which was found by barometric

George P. Stoney. Midshipman, Sept. 21, 1870; graduated, Sept. 17, 1875; Ensign, Oct. 9, 1876; Lieutenant (Junior), June 25, 1883.

Meredith D. Jones. Assistant Surgeon, May 17, 1871; Passed-Assistant Surgeon, Feb. 6, 1875.

A. V. Zane. Cadet Engineer, Oct. 1, 1871; graduated, May 31, 1874; Assistant Engineer, Feb. 26, 1875; Passed-Assistant Engineer, Aug. 23, 1881.

J. D. Castillo. Assistant Surgeon, July 6, 1880; resigned, Oct. 1, 1883.

measurement to be two thousand five hundred feet high — a remarkable confirmation of the estimate made by Captain Long of the whaling barque "Nile," 1867, who sailed along the south coast for two days as has been related in the Second Cruise of the "Corwin." His estimated height of this peak will be found on the circumpolar chart (pocket of this volume) to have been two thousand four hundred and eighty feet. The day was very clear, but no land, except Herald Island was visible from the summit. The whole coast line, except a few miles of outlying sand spits, was examined, but Berry found it impossible to believe that any of the missing parties had landed there. The thorough examination of the coast was a second determination of that made previously by the ill-fated "Jeannette," that Wrangell Land is an *island* instead of a part of the supposed Arctic Continent. It is about seventy miles long, east and west, and thirty-five miles broad, including the sand-spits which make out from six to ten miles from the north and the south coast. A range of high hills extends completely around the island near the coast line, and a lower range from east to west near the centre. The whole island is a succession of peaks and valleys. Several streams were found, the largest of which, rising near the centre peak (Berry's), flows into the sea in an easterly magnetic direction.

In "Hydrographic Notice," No. 84, of 1881, Commodore De Kraft says: "The harbor was found to be small but excellent, of moderate depth of water. It is situated in the southeastern part of the island, and is formed by a bight in the coast-line just east of a projecting promontory. Protected on the south by a low neck of sand and pebbles, it is a little more than two hundred yards in extent either way, with a depth of from three to three and a half fathoms in the centre. Three fathoms can be carried close to the shore on the south side, and two and two and a half fathoms close to the bluff, on the north side. There are no hidden dangers. The observation spot, near the western extremity of the low, sandy neck, is in lat. $70^{\circ} 57' N.$, long. $178^{\circ} 10' W.$ Magnetic variation $20^{\circ} E.$ Rise and fall of tide five feet; flood tide sets to the southward and westward. . . .

"The 'Rodgers' left Wrangell Island on the 13th of September, and, after making an ineffectual attempt to land on Herald Island to

ARCTIC OCEAN.
NORTH OF BURNING STEEL.

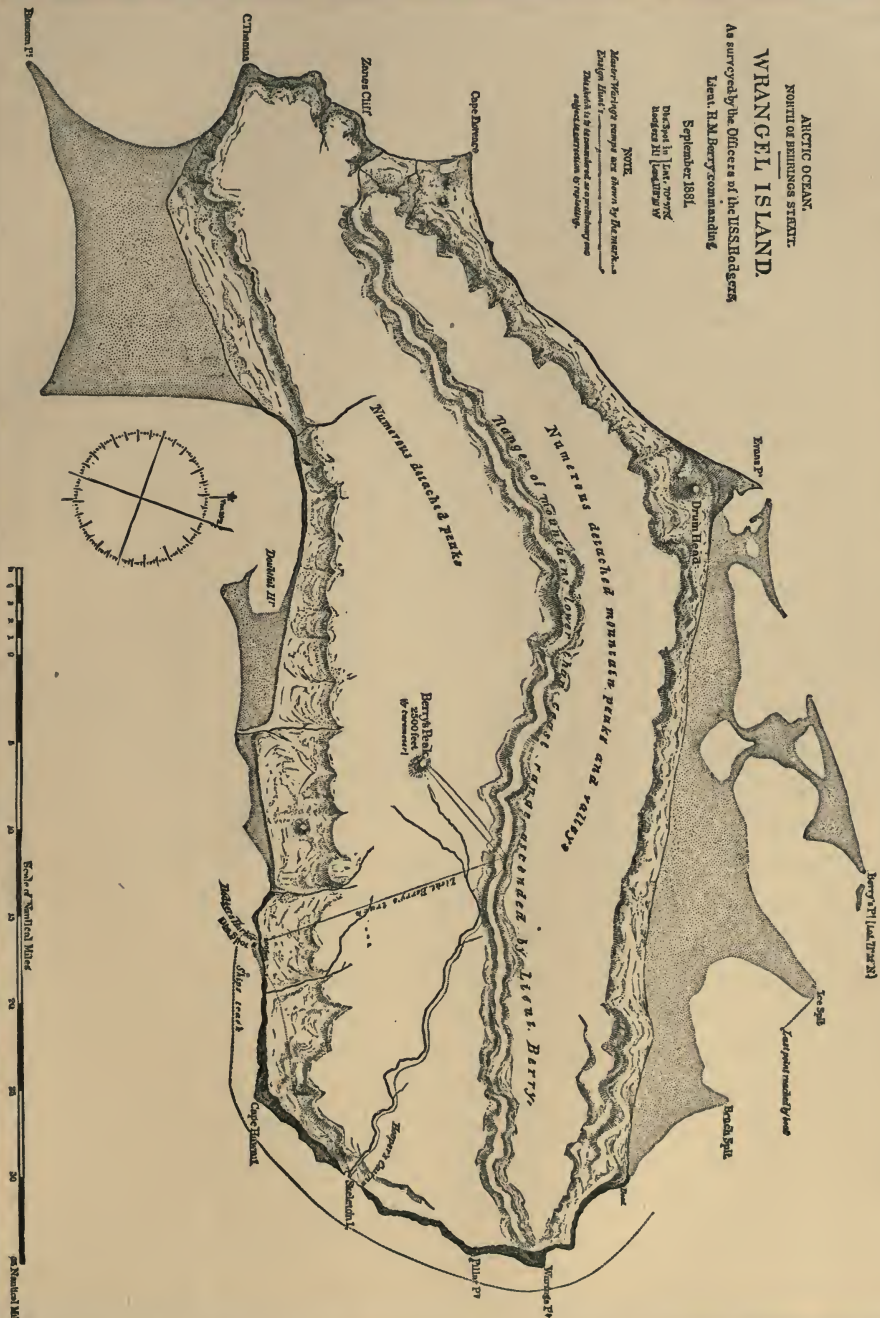
WRANGEL ISLAND.

As surveyed by the Officers of the USS *Hodges*
Lieut. R. M. Berry commanding
September 1881.

Discovered in Jan. 1874
by Lieut. R. M. Berry
and Lieut. J. W. Smith.

NOTE.

Water depths except near shore by the method
of sounding with a line, and the soundings
are given in fathoms.



complete its examination, steamed to the northward until stopped, September 17, by an impenetrable pack in lat. $73^{\circ} 9' N.$, long. $174^{\circ} W.$, when, it being dark, and having made only fifteen miles after working all day, the ship was made fast to a floe for the night. New ice was formed during the night, cementing the floes together, and when, at 3 A.M. on the morning of the 18th, an attempt was made to reach a lead about one hundred yards distant, it required an hour and fifteen minutes steaming at full speed to accomplish it, after which the pack was skirted to the northeastward until, having reached lat. $73^{\circ} 44' N.$, long. $171^{\circ} 48' W.$, it was found impossible to proceed any farther in that direction. From this position no indications of land could be seen from the crow's nest, but, on the contrary, the soundings invariably deepened as the vessel proceeded north. It was therefore thought best, as the main pack trended well to the southward of east from this point, to return to the northeast point of Wrangell Island, and proceed thence in a northwesterly direction in search of the high land reported by Captain Smith, of the whaling barque "New Bedford," as "situated in long. $178^{\circ} W.$, and extending as far north of the seventy-third parallel as the eye could reach.

"Leaving Wrangell Island a second time, on September 22, the one hundred and seventy-eighth meridian was crossed and a position in lat. $73^{\circ} 28' N.$, long. $179^{\circ} 52' E.$, was reached, where the solid pack was again encountered; thence steering to the southeastward, along the edge of the pack, the one hundred, and seventy-eighth meridian was recrossed in lat. $73^{\circ} N.$, without sighting land, the horizon throughout and the sky to the northward being clear. As before, it was found that the depth of water gradually increased northward of Wrangell Island, but the depths were less than to the northeastward, the greatest depth (eighty-two fathoms) having been found at the most northeasterly point reached, viz. lat. $73^{\circ} 44' N.$, long. $171^{\circ} 48' W.$

"Except in a few instances, where a lead was followed for a short distance, the ice was of such a nature as to make it impossible to pass its outer edge, consisting in some places of heavy pack and in others of unbroken fields, miles in extent. The field-ice was from two to three feet out of water."

THE RETURN.

A longer stay would have endangered the ship at this late date, September 27; Captain Berry therefore turned South for winter quarters. Under the instructions of the Naval Board and the Secretary, the ship was not to winter in the Arctic with any inordinate risk, and Berry deemed it useless to winter at Wrangell Land which had proved to be so small an island with no other land near it. He headed for the coast of Siberia, which he examined from Cape Jakan eastward, and on Tiapka Island, twenty miles west of Cape Serdze, he put up a house and left a party supplied with provisions, clothing, and fuel for a year, with a boat, dogs, and sleds, to explore the coast westward in search of the "Jeannette" crew, and the survivors of the "Mount Wollaston" and "Vigilant." He would return for this party later in the season when the falling snow had made travelling possible, or if prevented from this, would return for them as soon as the ice the next summer would permit. The party consisted of Master C. F. Putnam, U. S. N., Surgeon Jones, Mr. Gilder, two seamen, and a native as dog driver. Leaving them ashore, October 8, the "Rodgers" steamed for St. Lawrence Bay, where she arrived after a week's experience of thick and stormy weather with violent gales. The preparations for the winter were unfortunately kept back by continued bad weather, which prevented the transfer to the shore of a large part of the provisions and supplies.

THE SHIP BURNED.

November 20, Ensign Hunt started up the coast with a dog-team to visit the camp of Master Putnam, but was compelled by severe storms to return to the ship. In the morning of November 30, the startling cry of fire was heard on board the "Rodgers," issuing from the hold, which was so closely filled with stores that it was next to impossible to get water into it. By 4 P. M. some of these had been secured, the men working in the smoke and carbonic acid gas below decks; the boats being loaded the ship was abandoned at midnight. She drifted up the bay, rigging and sails on fire, and her magazine

exploded in the early morning. The cause of the fire could not be learned; it was probably from spontaneous combustion or from the firing of the deck underneath from the donkey boiler.

In a camp formed of overturned boats, sails and tents, officers and crew found a shelter from a violent snow-storm; next morning a party of natives from the village Noomamoo, seven miles off, came to offer a hospitable refuge in their huts, and the party after a fatiguing tramp were distributed among the eleven homes which made the settlement, making the uncomfortable exchange of ship life to a winter's siege on walrus and blubber. Afterward the officers and crew were divided into four parties and scattered in three other villages within a radius of twenty miles.

Natives communicating the news of the burning of the ship to Putnam, he started south with four loaded sledges for their relief, meeting Lieutenant Berry, who was on his way to Putnam's camp. Continuing his trip under orders, he delivered his provisions on January 4, and on the 10th started on his return accompanied by Hunt, Zane, Castillo, and three natives, driving his own team of nine dogs. In an attempt to face a heavy gale, probably not having the ability to control the dogs, or not being aware of the abrupt deviation from the course taken by the other sleds, he missed his way in crossing the bay and drifted out to sea on an ice floe. An immediate hunt which was entreated of the natives was not permitted that night by the violence of the gale, and the wind unhappily detached the ice from the shore, and carried it to sea; next morning all was clear water. On the 14th and on the 17th, the search was renewed along the shore thirty miles, but no good news was heard; on the 29th it was learned that six of the dogs had come ashore without harness, one of them with a pistol-shot wound in his neck, given probably by Putnam who intended to use it for food, had he succeeded in escaping. He was seen three days afterward, being carried out to sea, but an earnest effort to reach him in a canoe failed, the ice cutting through the boat. How long he survived can never be known; the temperature was from twenty to forty degrees below zero, and he had no protection from the fierce winds, except his warm clothing. His death was either from the cold, want of food, or from the breaking up of the floe.

A month's search on the shore made by Waring and Stoney revealed nothing more of one of the most promising officers of the expedition.

In the meantime, February 8, Lieutenant Berry, as yet unacquainted with this sad disaster, left Cape Serdze with Hunt to follow the coast westward in search of the missing crews; arriving at the Russian post of Nishne March 24, he learned of the landing of part of the "Jeanette's" crew at the mouth of the Lena, and continued his journey, overtaking Chief Engineer Melville's search party, and proceeding to Yakutsk. Berry intended to fit out a new expedition, but on learning that Lieutenant Harber had been ordered by Secretary Chandler to make a summer search, he returned home, and Hunt joined Harber.

The party from the "Rodgers" left on shore at St. Lawrence Bay under Master Waring, U. S. N., was received on board the whaling barque "North Star," Captain L. C. Owens, of New Bedford, May 8, the Captain, having heard of the party by a letter which Waring had entrusted to the natives for any passing whaling vessel, had forced his ship through the opposite ice for their rescue. On their way to Ounak-laska, falling in with the revenue cutter "Corwin," the "Rodgers'" party were transferred to her, arriving in San Francisco June 23, 1882. In his report to the Department, Lieutenant Berry earnestly recommended that the Tchukchis of St. Lawrence Bay be rewarded for their hospitality, to encourage them to aid the crews of any of our whaling or other vessels that may be wrecked upon their coast. Before leaving them, May 14, Master Waring had distributed among them all the remaining supplies and ammunition. A court of inquiry asked for by Lieutenant Berry fully exonerated him for the loss of the "Rodgers."

Secretary Chandler having approved the recommendation to reward the Tchukchis, an appropriation of \$3,000 was made by Congress for this purpose, and on the 12th of March, 1883, Lieutenant Stoney was sent out by the Navy Department to distribute such presents as Berry should suggest to the natives, including the women who had repaired the clothing of the seamen of the "Rodgers." The Act of Congress recites the purpose of "suitably rewarding the natives at and about St. Lawrence Bay who housed, fed, and extended other kindnesses to the officers and men of the U. S. S. 'Rodgers.'"

At the meeting of the Royal Geographical Society, London, held December 12, 1881, the Secretary, C. R. Markham, said:—

“The complete exploration of Wrangell Land by the officers of the ‘Rodgers’ is a great geographical achievement. For this far-off island, so long heard of and at last sighted, but always on the very threshold of the unknown, has been one of the longed-for goals of discovery ever since the Tehuktchis told Baron Wrangell that it could be seen on a clear day from Cape Jakan. They said that herds of deer sometimes came from thence across the ice; and their traditions related how the Onkilon, Omoki, and other tribes had wandered northward over the ice to distant lands. So that there was a halo of romance over the Siberian ‘Ultima Thule,’ which was heightened by the gallant, but vain efforts of Wrangell himself to reach it by dog sledges in 1822 and 1823. At length it was actually sighted by Captain Kellett in 1849, when he discovered Herald Island in 71° 12′ N. The American Captain Long also sighted it in 1867, and others have done so since.

“But now it has been thoroughly explored, and is a mystery no longer. Wrangell Land turns out to be an island forty miles broad, between 70° 50′ N. and 71° 32′ N., sixty-six miles long and eighty miles from the nearest point on the Siberian coast; Herald Island lies thirty miles due east.”

CRUISE OF THE UNITED STATES STEAMER “ALLIANCE,” JUNE 16 TO
OCTOBER 11, 1881.

FITTING OUT OF THE “ALLIANCE.”—INSTRUCTIONS TO COMMANDER COOPER AND TO COMMANDER WADLEIGH.—ARRIVAL AT REYKIAVIK.—DESCRIPTION OF THE “JEANNETTE” CIRCULATED.—THE HARBOR OF HAMMERFEST, NORWAY.—GREEN BAY, SPITZBERGEN.—TIDAL MARKS ESTABLISHED.—CRUISE IN LAT. 79°.—THE ICE BARRIER.—RETURN TO THE UNITED STATES UNDER ORDERS.

The Navy Department, in order to avail itself of every possible means of relief to the “Jeannette” or her officers and crew in event of her loss, “determined at the same time with the sending of the ‘Rodgers’ through Bering Strait, to dispatch another vessel on a

cruise for the missing ship between Greenland, Iceland, and the coast of Norway and Spitzbergen as far north as 77° lat., and further if it should be found practicable without danger from the ice. Secretary Hunt reported to Congress that this decision was made on the suggestion of "the liberal and public-spirited citizen through whose munificence and disinterested efforts to contribute to the cause of science, the 'Jeannette' had been sent forth." The U. S. screw steamer "Alliance," third-rate, of the North Atlantic Fleet, was selected for the service, and fitted for Arctic Exploration at the Norfolk Navy Yard, chiefly by live-oak sheathing to her bow and a strong iron guard on her stem.

June 14, the Secretary instructed Commander G. H. Wadleigh, ordered to succeed Commander Cooper, detached on account of ill health, that he would first ascertain the limits of the pack-ice between Greenland and Spitzbergen, and should make the fullest observations practicable of sea temperatures, and of other ocean phenomena, including specific gravity and degrees of phosphorescence, with specimens from the surface, and by drag-nets from the bottom. The northern waters offer a fine field for these researches, and few of their organisms are found in American collections; these, therefore, with those of fauna and flora, were to be made at every convenient landing at Iceland, Greenland, and Spitzbergen. Commander Wadleigh was also to prepare for the Hydrographic Office a chart with the drawing of the ship's track, and of the field ice and icebergs encountered.

These instructions for the benefit of science were to be subordinated to those previously given to Commander Cooper, dated May 27, 1881, in which Secretary Hunt had marked out with more than usual detail the route of the "Alliance," enclosing even an itinerary, but still leaving as usual much to the commander's discretion, except that the time of the cruise in the Arctic Region was limited to September 25, the ship not being fitted for Arctic Exploration, but sent only as a relief.

June 16, the "Alliance" left Hampton Roads, reached St. John's the 24th, and Reykiavik, July 12. Here, the Parliament of Iceland being in session, Governor Finssen made many inquiries of the members in regard to the currents, drift-wood, etc., setting on the coasts.

Commander Wadleigh distributed, through the members, a description of the "Jeannette," printed in Icelandic, with the offer of a reward for any reliable information from the districts represented. Captain Vence, of the French corvette "Dupleix," put at Wadleigh's disposal the result of surveys which he had been making around the island.

July 24, the ship anchored in the harbor of Hammerfest, Norway, cruising from which on the 31st, she sighted Bear Island, and finding it surrounded by ice, went from thence to Bel Sound and Green Harbor, Spitzbergen, cruising along the edge of the pack as far as lat. $80^{\circ} 10' N.$, and running as far east as long. $13^{\circ} 15'$, to a point ten miles northwest of Welcome Point, along which the ice was impenetrable. Green Bay was found to be the most frequented harbor of Spitzbergen; it is well protected from all but northeast winds, is very deep, vessels of any size being accustomed to anchor in from twenty-five to thirty fathoms of water, and then within a cable's length of the shore.

Saxe Haven was found nearly full of ice August 5. Here Lieutenant Perkins of the "Alliance" searched for the tide mark left there by Professor Nordenskiöld in 1864, but did not find it, probably from the crumbling of the rocks. He left a tide mark on the southeast side of the same small islet, "just off the entrance to Saxe Haven" as named by Nordenskiöld, consisting of a copper plate with the ship's name and date of visit; the spike holding the plate being nine feet above the sea at low water, 1 P. M., August 5.

With Master Schwenk he also established a bench mark on a boulder in the middle of a small bight west of Hakluyt's Headland, Amsterdam Island, lat. $79^{\circ} 49' N.$, long. $11^{\circ} 15' E.$, and drove a spike into a natural tablet on the cliff bearing northeast and north from the plate. These bench marks were established in accordance with the suggestions of the International Arctic Commission for hypsometrical and tidal observations as included in the instructions of the Navy Department. The time of high water, full moon, August 10, was found to be one hour forty-four minutes A. M.; rise and fall of tide, four feet eleven inches. The dip of the magnetic needle at same place was $80^{\circ} 31' 13''.5$. The variation of the compass on Moff Island, south latitude, was $17^{\circ} 30' 45'' W.$, and the dip of magnetic needle $80^{\circ} 32' 48''$.

August 27, the "Alliance" left Spitzbergen and cruised under sail until September 11, to Hammerfest, after which she succeeded in getting again as far north as $79^{\circ} 3' 36''$. The ice and the weather showed Commander Wadleigh that it would be unsafe to attempt to reach Cape Brewster; no ship, he thought, should attempt to force a passage to the east coast of Greenland without being fitted to pass at least one winter in the ice. September 25, under the instructions of the Department as already named, he began his return, arriving at Reykiavik, October 10, Halifax, Nova Scotia, November 1, and New York, on the 11th. While at Reykiavik he received news from Governor Finssen of the stranding and wreck of a merchant vessel of twelve hundred tons, June 26, 1881, on the rocks just outside of Thorshaven. The Governmental examination which had been made of this ship had found upon it the inscription "Jamestown," Boston, Mass. There was, however, no information offered to Commander Wadleigh, indicating in any manner the slightest knowledge or rumor of the "Jeannette."

The instructions of the Department in regard to scientific objects were carried out as far as practicable by making floral and geological collections, specimens of birds and animals, and the more important Hydrographical data which have been named. The cruise had its origin in the possibility of the drift of the "Jeannette" by a northwest current into the open Polar Sea of theory, and a successful crossing into the region searched by the "Alliance." This possibility justified the cruise, but the unfortunate "Jeannette" was nearly a half circle further east, and beyond the impassable North Asiatic ice barrier. The cruise of the "Alliance" closed the efforts of America for the relief of the "Jeannette." It is of interest to note that Expeditions were proposed by our English and French friends, and that they would have been sent out had not the news been received from the parties on the Siberian coast. See Proceedings of Royal Geographical Society, and of the Société de Géographie.

NOTE.—The opportunity offers itself at this hour only, to correct a previous statement (quoted), that Lieutenant Chipp's observations made on the "Jeannette" were lost with his boat. Engineer Melville brought to Washington every particle of the "Jeannette" Records; all were found by him on the Lena Delta.

CHAPTER XII.

THE ANTARCTIC CRUISE OF LIEUTENANT (LATE ADMIRAL) CHARLES WILKES, U. S. N., 1839-40.

THE ANTARCTIC REGION A *TERRA INCOGNITA*.—OBJECT OF ITS EXPLORATIONS COMPARED WITH EXPLORATIONS IN THE ARCTIC.—NATIONAL AID REQUIRED.—EARLIEST AMERICAN DISCOVERY.—FOREIGN EXPLORATIONS, PRIVATE AND NATIONAL.—WILKES' CRUISE A PART OF THE PLANS OF THE EXPLORING EXPEDITION OF 1838-42.—ORGANIZATION OF THE SQUADRON AND ITS ROUTE.—FIRST CRUISE TOWARDS COOK'S *NE-PLUS-ULTRA*.—CRUISE ALONG THE ICY BARRIER.—REPORTED DISCOVERY OF THE CONTINENT.—AWARD OF THE GOLD MEDAL BY ROYAL GEOGRAPHICAL SOCIETY, LONDON.—DISCOVERIES OF ROSS.—SCIENTIFIC RESULTS.—COLLECTIONS IN THE NATIONAL MUSEUM, WASHINGTON.

IT has been forcibly remarked that of some parts of our earth we know less than we do of the moon or even of some of the distant planets. The Astronomer has measured the lunar mountains and their craters, and, passing beyond our satellite, has determined something of the physical condition not only of the nearer planets of the Solar system, but of those of the more remote; by the revelations of the spectroscope, learning in part the structure of the nearer members of the Stellar universe. But, even at this day of advanced science, and of the marvellous appliances which she both creates and uses, the true physical character of the furthest northern and southern regions of the globe remains almost unknown; the seemingly simple question, how much land and how much open water exists within the Arctic and Antarctic zones, cannot be answered. Especially is this true of the Antarctic zone, to which few indeed give a passing thought, finding it on their maps and in their geographies, a blank.

In this point and as regards the efforts of the explorer to penetrate within the circle, a marked contrast presents itself in relation to the opposite Polar Region—a contrast which has been briefly spoken of in

the first pages of this volume. The extreme natural differences in the character of the two zones as there referred to, will show themselves somewhat more at length in what here follows, by contrasting the objects of explorations within the two circles, and the efforts resulting from them. As introductory, therefore, to a brief notice of American Antarctic Exploration, it is proper to pass in review the objects before the chief Antarctic voyagers; naming and locating also their tracks and discoveries.

The area of the Antarctic circle is eight million one hundred and fifty-five thousand six hundred square miles, an area equal in extent to the one-sixth part of the entire land surface of the globe; its unexplored portion about twice as large as Europe. Lieutenant Maury, from whose *Physical Geography of the Sea* (enlarged edition of 1861), this is cited, adds: "This untravelled region is circular in shape, the circumference of which does not measure less than seven thousand miles. Its edges have been penetrated here and there, and land, wherever seen, has been high and rugged. The unexplored area there is quite equal to that of our entire frigid zone. Navigators on the voyage from the Cape of Good Hope to Melbourne, and from Melbourne to Cape Horn, scarcely ever venture, except while passing Cape Horn, to go on the Polar side of 55° S. The fear of icebergs deters them. These may be seen there drifting up toward the equator in large numbers and large masses all the year round. I have encountered them myself as high up as the parallel of 37° S." The belt of ocean that encircles this globe on the Polar side of 55° S., is never free from ice. Many of them are miles in extent and hundreds of feet thick. The area on the Polar side of the fifty-fifth parallel of south latitude comprehends a space of 17,784,600 square miles. The nursery for the bergs, to fill such a field, must be an immense one; such a nursery cannot be on the sea, for icebergs require to be fastened firmly to the shore until they attain full size. They therefore, in their mute way, are loud with evidence in favor of Antarctic shore-lines of great extent, of deep bays where they may be formed, and of lofty cliffs whence they may be launched. Off the Cape of Good Hope they have been seen as far as the parallel of 35° .

For the last two hundred years the Arctic ocean has been a theatre for exploration; but as for the Antarctic, no expedition has attempted to make any *persistent* exploration or even to winter there.

In Chapter I. it has been shown that the first *Arctic* Explorations had their origin in a commercial object; for it was believed that by finding a passage around the northern shores either of America or of Asia, the riches of the east would be more readily secured. A route around Cape Horn too was uninviting because of the storms of the Antarctic Seas. Additionally to the commercial object, was the "barren ambition" to attain or approach the North Pole, as shown for example by the boat and sledge expedition of Parry's voyage from Spitzbergen poleward, at the date of which, rewards were offered for reaching the highest latitudes, and £10,000 to reach the Pole. Yet to this object a scientific interest soon began to attach itself. The north magnetic pole of the earth and the northern pole of cold were to be located, the isothermal lines to be laid down, and the important interests of the whaling trade promoted; all of which objects, in a greater or less degree, are indeed still involved in exploration in the Arctic, and to some extent in the Antarctic also.

But the original purpose just named as before the Arctic explorer had, of course, no place in Antarctic voyaging, for nothing of value could be conceivable in a route passing by the South Pole from one continent to another, the peninsular terminations of the continents being known to be relatively far more distant from the southern pole than the Arctic regions from the northern. For Antarctic Exploration, therefore, the earliest object could be simply to determine what lay within the vast space between these continental terminations and their pole. Within this void was the *Terra Australis Incognita*, so marked upon the maps, not only of the middle ages, but of those far down within the lines of modern history; for from the earliest date of the division of the earth into the old five zones or climates (separated as was supposed by the uninhabitable equatorial belt), the belief existed that beyond the supposed highly-heated region of the equator, lay this large continent extending to the Pole; and when it became known that the equator was inhabitable, the *unknown* was shifted further south; and

again on Van Dieman's exploration of Australia and Tasman's of New Zealand, it was again shifted south. It so remained until Captain Cook in 1774 dispelled the illusion by his circuit of the southern seas in high latitudes. In his own words, "he put an end to the search for a southern continent which had engrossed the attention of maritime nations for two centuries, and had been a favorite theme for geographers of all ages." He attained the lat. of $71^{\circ} 10'$ south on the one hundred and seventh meridian, and settled the form of New Zealand, New Caledonia, and other Australian lands and islands.

The disappearance of the *Terra Incognita* from the maps, and from the theory of the geographers, was not, however, a displacement of the belief in the existence of large land masses in the southern Polar zones. The theory of the continent had based itself chiefly on the *supposition* that one must exist there to counterbalance the lands of the opposite northern belt, in support of which idea Lieutenant Maury had said "It seems to be a physical necessity that land should not be antipodal to land." Within an area, therefore, equal in extent to one-sixth part of the entire land surface of the globe, it was urged that land must exist antipodal or opposite to the vast water area lying between the circle and Cape Horn and the Cape of Good Hope. Meteorological considerations, further urged by Lieutenant Maury, were chiefly the belief that mountain masses there appear to perform, in the chambers of the upper air, the office which the jet of cold water discharges for the exhausted steam in the condenser of an engine, Antarctic mountains and lofty peaks producing as condensers of excessive precipitation the steady flow of the winds of that region towards the South Pole. To determine the extent of such land masses, their elevations, and depressions, and the glaciers, or ice-fields within their indentations and off their shores, still remained objects of geographical investigation; and to these objects were to be added special researches in relation to botany and zoology, the flora and fauna of the southern latitudes, and other researches bearing an intimate relation to those in the high north. In the words of the Committee of the Royal Society of London, recommending the recent voyage of the "Challenger," "In the southern ocean the study of ocean temperatures is expected to afford the most

important results, and the observations of meteorological and magnetic phenomena there are even yet more important."

Antarctic explorations, therefore, for the purposes just named could not be lost sight of, but have been prosecuted at times by the aid of private liberality only and more extensively by national expeditions. In advocacy of Government aid, the *North British Review* (1847), referring to the Resolutions of the British Association which recommended the Naval Expedition of Sir James Ross, forcibly says:—

"The necessity of national aid in promoting and completing great physical theories, has been long admitted by every civilized nation in the case of astronomy, even when no practical or utilitarian result could be reasonably contemplated; but that necessity becomes doubly urgent in reference to those sciences which are likely to yield the most beneficial results both to navigation and commerce. When the efforts of private liberality and individual talent are inadequate to the solution of great problems in which national interests or national honor are involved, it becomes the paramount duty of every civilized State to supply from its treasury the sinews of thought, and the duty also of every true sovereign to hold out to the intellectual gladiator the laurels he can bestow. . . . "Great as have been the intellectual achievements of the past, and accelerated as has been the progress both of terrestrial and celestial physics in the present century, yet the deeper mysteries of creation remain undisclosed, and ages of herculean toil must pass away before man has executed his commission as the interpreter of Nature. The Scriptures foretell an epoch when 'knowledge shall increase, and man go to and fro upon the earth.' The ubiquity of science must, therefore, precede the universality of her dominion, and her dominion must be established before her conquests are secured. The last enemy to be subdued is Ignorance, and the last conqueror Reason. The current cycle cannot be closed till the earth's circuit has been spanned, her crypts laid open, and her skies explored. The last act of mental toil which is to unfold the last mystery of power, and display in its full development the glory of the Most High, will introduce another cycle of being, in which new combinations of matter will constitute a new arena for nobler forms of life, and higher orders of intelligence, and more lofty spheres of labor and enjoyment."

The history of the United States exhibits in many instances the sympathy of our people and of our legislative bodies with these ideas. National assistance for expeditions to the Southern Zone was not however extended by any government within the period of the more than half century which followed Cook's voyage; with the exception, therefore of the incidental discovery of the islands of Peter I., lat. 68° 57', long. 90° 46' W., and of Alexander I. in about the same latitude,

long. 73° by Captain Bellingshausen of the Russian Imperial ships "Mirny" and "Vostok" in the year 1821, Antarctic exploration was the work of private ships; at times that of a stray whaler.

It is to the credit of American enterprise that the first of such explorations, that of Captain Palmer, awakened and stimulated an interest in the Southern Zone, which favored the organization of national expeditions. And here it may be admitted with the author of "The History of the American Whale Fishery," Mr. A. Starbuck, that "as pioneers of the sea, whalers have been the advance guard of civilization; exploring expeditions following after to glean where they had reaped; in the frozen seas of the North and the South, their keels have ploughed to the extreme limits of navigation, and but for them the Western oceans would much longer have been comparatively unknown. . . . English whalers were the first that traded in the regions of Van Dieman's Land and Australia, and according to the *London Quarterly Review*, without them England might never have founded her colonies there, or if she had have maintained them in their early stages of danger and privation." (See Report by Prof. Baird of Fish Commission, 1875). Captain Palmer's discovery is illustrative of the general sentiment which accredits whalers as the pioneers of the sea.

PALMER'S LAND.

The *South Pacific Directory*, compiled by Findlay of London, and extensively used by American and English Navigators, rather strangely omits even in the edition of 1877, all notice of the discovery of this land lying not very far from the Antarctic Circle, while the *Directory* gives the full particulars of Biscoe's discovery of its southern extension at a later date. The Admiralty Ice Chart and their Polar Sea Charts also omit Palmer's Land. A reproduction probably of the former of these charts in Steiler's Atlas from the house of Perthes, Gotha, has done justice to American work. The discovery is referred to by an interesting note in the *North American Review* for 1834, in an article on the Whale Fishery. The *Review* says: "A few years since, (1821, two years before Biscoe's visit,) two Russian discovery ships came in sight of a group of cold, inhospitable islands in the Antarctic Ocean. The commander imagined himself a discoverer, and doubtless was prepared with drawn sword and with the flag of his sovereign flying over his head, to take possession in the name of the Czar. At this time he was becalmed in a dense fog. Judge of his surprise, when the fog cleared away, to see a little sealing sloop from Connecticut as quietly riding between his ships as if lying in the waters of Long Island

Sound. He learned from the captain that the islands were already well known, and that he had just returned from exploring the shores of a new land at the South; upon which the Russian gave vent to an expression too hard to be repeated, but sufficiently significant of his opinion of American enterprise. After the captain of the sloop he named the discovery 'Palmer's Land,' in which the American acquiesced, and by this name it appears to be designated on all the recently published Russian and English charts." Palmer's Land will be found on Steiler's Atlas south of the Shetland Islands, in about lat. $63^{\circ} 5'$, long. $57^{\circ} 55' W$. Judge Daly includes the discovery in his article on "Polar Research," in Johnson's Encyclopedia. The President of the Royal Geographical Society of London names it in his announcement of the awards of the Society for Geographical Discovery, voted by the Society to Captain Wilkes in 1848. A visit to it had been one element in the Instructions given by the Navy Department to the Expedition under Wilkes.

Following our enterprising American, Weddell in 1823 advanced three degrees further than Cook, reaching lat. $74^{\circ} 15' S$. Biscoe in 1831-33 discovered Graham Land, Enderby Land, and Kemp Land, on the edge of the circle, his brig the "Tula" having been under the instructions of its owners, Messrs. Enderby of London, to make search for new lands within the zone. The English Captain, Biscoe, received the gold medal of the Royal Geographical Society, London.

The subsequent discovery of Balleny Islands and Sabrina Land by Balleny in 1839 closes these individual efforts, bringing us to the era of the National Expeditions referred to, viz., those of D'Urville from France, Sir James Ross from England, and Wilkes from the United States, expeditions which found themselves in ready the same regions in the Antarctic within the same period, 1838-42. The cruise of the American squadron only claims attention in connection with the title of this volume.

LIEUTENANT WILKES' ANTARCTIC CRUISE A PART OF THE U. S. EXPLORING EXPEDITION OF 1838-42.

The American National Explorations made within the Antarctic Circle in the year 1840 were a part of those planned by Lieutenant Charles Wilkes, the Commander of the U.S. Exploring Expedition, 1838-42. This expedition was authorized by Congress by the Act of May 18, 1836, "for the purpose of exploring and surveying in the great Southern Ocean in the important interests of our commerce, embarked in the whale fisheries and other adventures in that ocean, as well as to determine the existence of all doubtful islands and shoals, and to discover and accurately fix the position of those which lie in or near the track pursued by our merchant vessels in that quarter, and may have escaped the observation of Scientific Navigators." For these purposes

the very liberal appropriation of \$300,000 was made by the Congress of the year just named.

By the instructions of Secretary Paulding, dated August 11, 1838, Lieutenant Charles Wilkes was advised that the President had appointed him to the command of a squadron organized for these objects, consisting of the sloops of war "Vincennes" and "Peacock," the store-ship "Relief," the brig "Porpoise" and tenders, "Sea Gull" and "Flying Fish." The Secretary also indicated the course of the cruise, naming the chief points to be visited by the expedition in the order of: Rio Janeiro, Cape Frio, the Rio Negro, and Terra del Fuego, thence the Southern Antarctic to the southward of Powell's group between it and Sandwich Land; thence to the southward and westward as far as the *Ne plus ultra* of Cook; thence to Valparaiso; the Navigators' group; the Fiji Islands; thence by a second attempt to penetrate within the Antarctic region, south of Van Diemen's Land, and thence to San Francisco via the Sandwich Islands, from which the return would be to Singapore and home by the way of the Cape of Good Hope.

OFFICERS.*

The senior officers of the squadron under Wilkes, were: Lieutenant William L. Hudson, commanding the "Peacock," Lieutenant-Command-

* Officers' Naval Record :—

- Charles Wilkes, Midshipman, Jan. 1, 1818; Lieutenant, April 28, 1826; Commander, July 13, 1843; Captain, Sept. 14, 1855; Commodore, July 16, 1862; Rear Admiral, Aug. 6, 1866; Died Feb. 7, 1877.
- W. L. Hudson, Midshipman, July 16, 1816; Lieutenant, April 28, 1826; Commander, Nov. 2, 1842; Captain, Sept. 14, 1855; Died Oct. 15, 1862.
- A. K. Long, Midshipman, Jan. 1, 1818; Lieutenant, March 3, 1827; Commander, Oct. 12, 1844; Captain, Sept. 14, 1855; Retired, Oct. 1, 1864; Died Oct. 6, 1866.
- S. R. Knox, Midshipman, April 1, 1828; Passed Midshipman, June 15, 1837; Lieutenant, Sept. 8, 1841; Captain on reserved list, April 4, 1867.
- J. W. E. Reid, Midshipman, Sept. 26, 1831; Passed Midshipman, June 15, 1837; *Lost at sea*, May, 1839, while commanding the "Sea Gull."
- T. T. Craven, Midshipman, May 1, 1822; Passed Midshipman, May 24, 1828; Lieutenant, May 27, 1830; Commander, Dec. 16, 1852; Captain, June 7, 1861; Commodore, July 16, 1863; Rear Admiral, Oct. 10, 1866; Retired Dec. 30, 1869.
- O. Carr, Midshipman, March 11, 1827; Passed Midshipman, June 10, 1832; Lieutenant, Dec. 8, 1838; Commander, Sept. 14, 1855; Captain, Retired, April 4, 1867.

ants A. K. Long and Cadwallader Ringgold, Commandant Samuel R. Knox and Passed Midshipman James W. E. Reid, commanding re-

R. E. Johnson, Midshipman, Oct. 1, 1827; Passed Midshipman, June 10, 1833; Lieutenant, Feb. 12, 1839; Died Feb. 4, 1855.

James Alden, Midshipman, April 1, 1828; Passed Midshipman, June 14, 1834; Lieutenant, Feb. 28, 1840; Commodore, Sept. 14, 1855; Captain, Jan. 2, 1863; Commodore, July 25, 1865; Rear Admiral, Jan. 19, 1871; Died Feb. 5, 1877.

W. L. Maury, Midshipman, Feb. 2, 1829; Passed Midshipman, July 3, 1835; Lieutenant, Feb. 26, 1841; Resigned April 20, 1851.

S. P. Lee, Midshipman, Nov. 22, 1825; Passed Midshipman, June 4, 1831; Lieutenant, Feb. 9, 1837; Commander, Sept. 14, 1855; Captain, July 16, 1862; Commodore, July 25, 1866; Rear Admiral, April 22, 1870; Retired Feb. 13, 1873.

W. M. Walker, Midshipman, Nov. 1, 1827; Passed Midshipman, June 10, 1833; Lieutenant, Dec. 8, 1838; Commander, Sept. 14, 1855; Captain, July 16, 1862; Died Nov. 24, 1863.

G. F. Emmons, Midshipman, April 1, 1828; Passed Midshipman, June 14, 1834; Lieutenant, Feb. 25, 1841; Commander, Jan. 28, 1856; Captain, Feb. 7, 1833; Commodore, Sept. 20, 1868; Rear Admiral, Nov. 25, 1872; Retired Aug. 23, 1873.

O. H. Perry, Midshipman, Feb. 28, 1829; Passed Midshipman, July 3, 1855; Lieutenant, Feb. 23, 1841; Resigned July 23, 1849.

R. F. Pinkney, Midshipman, Dec. 1, 1827; Passed Midshipman, June 10, 1833; Lieutenant Feb. 28, 1838; Commander, Sept. 14, 1855; Resigned April 23, 1861.

A. L. Case, Midshipman, April 1, 1828; Passed Midshipman, June 14, 1834; Lieutenant, Feb. 25, 1841; Commander, Sept. 14, 1855; Captain, Jan. 2, 1863; Commodore, Dec. 8, 1867; Rear Admiral, May 24, 1872; Retired Feb. 3, 1875.

Joseph A. Underwood, Midshipman, Feb. 2, 1829; Passed Midshipman, July 3, 1855; *Killed* at Mololo Islands by Fiji islanders, July 24, 1840.

M. G. L. Claiborne, Midshipman, Feb. 1, 1827; Passed Midshipman, June 10, 1833; Lieutenant, June 22, 1838; Resigned June 1, 1849.

H. J. Hartstene, Midshipman, April 1, 1828; Passed Midshipman, June 14, 1834; Lieutenant, Feb. 23, 1840; Commander, Sept. 14, 1855; Resigned Jan. 9, 1861.

J. B. Dale, Midshipman, Feb. 2, 1824; Passed Midshipman, July 3, 1835; Lieutenant, Feb. 25, 1845; Died July 24, 1848.

James Palmer, Acting Surgeon, Assistant Surgeon, March 26, 1834; Surgeon, Oct. 27, 1841; Medical Director, March 3, 1871; Retired June 29, 1873; Died April 24, 1883.

E. Gilchrist, Acting Surgeon, Jan. 26, 1832; Passed-Assistant Surgeon, Nov. 8, 1836; Surgeon, Sept. 21, 1840; Died Nov. 6, 1869.

J. L. Fox, Assistant Surgeon, Feb. 9, 1837; Passed-Assistant Surgeon, June 6, 1842; Surgeon, Aug. 16, 1847; Died Dec. 17, 1864.

J. F. Sickles, Assistant Surgeon, Feb. 28, 1833; Surgeon, Sept. 8, 1841; Died April 18, 1848.

C. F. B. Guillou, Acting Surgeon, Feb. 9, 1837; Passed-Assistant Surgeon, June 6, 1842; Surgeon, Aug. 28, 1847; Retired Sept. 15, 1854.

J. S. Whittle, Assistant Surgeon, June 20, 1838; Died April 5, 1850.

R. R. Waldron, Purser, entered the service June 15, 1827; Died Oct. 30, 1846.

W. Speiden, Purser, entered the service Aug. 30, 1837; Died Dec. 1861.

spectively the other vessels which have been named, and the following Lieutenants, T. T. Craven, O. Carr, R. E. Johnson, J. Alden, W. L. Maury, S. P. Lee, W. M. Walker, G. F. Emmons, O. H. Perry, R. F. Pinkney, A. L. Case, J. A. Underwood, M. G. L. Claiborne, H. J. Hartstene, and J. B. Dale. The late U. S. Surgeon-General James Palmer, Silas Holmes, J. S. Whittle, E. L. Gilchrist, J. L. Fox, J. F. Sickles, and C. F. B. Guillou were the acting surgeons. R. R. Waldron was *Purser*—a title now supplied in the navy by that of Paymaster. The whole number of officers who sailed with the Expedition was eighty-four, exclusive of the Scientific Corps of twelve civilians. This corps was composed of Messrs. Charles Pickering, J. Drayton, J. D. Brackenridge, J. D. Dana, T. R. Peale, A. T. Agate, H. Hale, J. G. Brown, J. W. Dyer, W. Rich, J. P. Couthouy, and F. L. Davenport, the last named as the Interpreter. The complement of the seamen exceeded five hundred.

The Secretary instructed the Commander that the Corps of Scientific gentlemen was placed under his direction for the more successful attainments of science and knowledge, for the prosecution of which he was to take all occasions not incompatible with the primary objects of the Expedition. The hydrography and geography of the various seas and countries pointed out in the preceding instructions and all the researches connected with them, as well as with astronomy, terrestrial magnetism, and meteorology, were confided exclusively to the officers of the navy, on whose zeal and talents the Department confidently relied for such results as would enable future navigators to pass over without fear or danger the track traversed by the vessels of the Expedition.

Lieutenant Wilkes, who received the offer of command, was well qualified by his previous astronomical and other professional experience. He had established the first fixed observatory in the United States—a small building in the city of Washington, north of the Capitol. The lamented Gilliss, succeeding him in charge of this, made those continuous and valued observations, chiefly for the use of Wilkes' squadron on its return, which are contained in the two volumes published in 1846 by the Senate; observations which led to the establishment of the present U. S. Naval Observatory.

The organization of the squadron seems to have been different from that which would be made at the present day ; for under the old *régime* of the Navy Department, it was under the charge of the Board of Navy Commissioners of that date, who selected the ships previous to, and, therefore, without the advice of a commander who was to be at the head of so important an expedition ; in consequence also of the temporary sickness of Secretary Dickerson, the preliminary orders emanated from the Secretary of War, the Hon. Joel R. Poinsett. At the time of sailing, the "Relief" was the only one of the vessels belonging to the number of those originally selected. It must be remembered also in any judgment of the labors of the expedition, that it contained no ship of steam power, or in any way fitted out with the modern appliances indispensable for conflict with the ice-fields of the Antarctic. The "Vincennes" was a sloop of seven hundred and eighty tons, originally single-decked and with but a light deck now added ; the "Peacock" was of six hundred and fifty tons only ; the "Porpoise" a gun brig of two hundred and thirty only ; the tenders were New York pilot boats ; and the "Relief," a store ship of such slow rate of sailing as made her ill adapted for the cruise. The "Peacock," before sailing, was found to have her upper works worn and much decayed — seriously developing this on the cruise.

In another distinct feature the expedition bore a peculiar character, by the acceptance on the part of Lieutenant Hudson of the appointment as second in command, his naval rank being above that of Lieutenant Wilkes. This acceptance was the result of a very complimentary letter received by Lieutenant Hudson from Mr. Poinsett, Acting Secretary of the Navy, and the publication therewith of the Navy General Order of June 22, 1838, which recited that "the armament of the Exploring Expedition, being adapted merely for its necessary defence while engaged in the examination and survey of the Southern Ocean, against any attempt to disturb its operations by the savage and warlike inhabitants of those islands, and the objects which it is destined to promote being altogether scientific and useful, intended for the benefit equally of the United States and of all commercial nations of the world, it is *considered to be entirely divested of all military character* ;

even in the event of the country being involved in a war, before the return of the squadron, its path upon the ocean will be peaceful, and its pursuits respected by all belligerents. The President has, therefore, thought proper, in assigning officers to the command of this squadron, to depart from the usual custom of selecting them from the senior ranks of the navy and according to their respective grades in the service; and has appointed Lieutenant Charles Wilkes, first officer, to command the Exploring Expedition, and Lieutenant William L. Hudson to command the ship 'Peacock,' and to be second officer of said squadron, and take command thereof, in the event of the death of the first officer, or his disability, from accident or sickness, to conduct the operations of the expedition."

The squadron got under way from Norfolk, Va., on Saturday, the 18th of August, 1838, and on the 25th the Commander laid his course for Rio via the island of Madeira, reaching Funchal, September 16, the Cape Verde Islands, October 6, and the harbor of Rio the 23d of November. From the last-named port the course laid down in the instructions of the Secretary was again taken up.

THE ANTARCTIC CRUISE.

The squadron, leaving Rio de Janeiro, January 6, stood to the southward for the Rio Negro, made there the investigations referred to in its instructions, and on the 2d of February, sailed for Cape Horn, passing over the localities of those shoals which had been said to exist in its track and through the Straits of Le Maire. From thence, passing around Cape Horn, Wilkes anchored in Orange Harbor. He then sent the "Peacock" and "Flying Fish" toward the *Ne plus ultra* of Cook, and took the "Porpoise" and "Sea Gull" to accomplish that part of his instructions which required exploration between Powell's group and Palmer's Land. He says:—

"We all left Orange Harbor on the 24th February. I had little idea of effecting anything at this late season. The only thing that appeared possible was the sighting of Palmer's Land, and getting its trend to the southward and eastward. I judged the lateness of the season might be favorable for this object, from the summer's ice having drifted off; the trend of the land to the south-southeast was seen

for about thirty miles, and several small, rocky islets were found off its eastern cape, which I named Cape Hope. It is high, and, like all the land in high latitudes, covered with snow and ice. The South Shetlands were sighted and points verified as well as they could be with the weather we had. During this time of thirty-six days, we had scarcely a single day to dry clothes, and the men suffered much from the continued dampness they were exposed to. We acquired all that could be expected at the late season of the year, namely some experience among the ice."

The "Peacock" and "Flying Fish," which had chiefly for their object to learn whether the line of icy barrier had increased to the northward since the time of Cook, met with very boisterous weather; the second of these vessels reached within sixty miles of the *Ne plus ultra* before she fell in with the firm barrier; after incurring much hazard, both ships returned north. After further surveys, particularly at the Sandwich Islands, where, at Point Venus, a tide-pillar was planted, Wilkes sailed for Sydney, New South Wales. From this point the second and most important part of the cruise was made by the "Vincennes," the "Peacock," and the "Porpoise" of the squadron, the tender, "Sea Gull," having been previously lost in a gale off the coast of Chili, and the "Flying Fish" being unable to proceed further than the first rendezvous appointed, MacQuarie Island, lat. 54° 44' S., long. 159° 49' E.

Lieutenant Wilkes left the hospitable harbor of Sydney, New South Wales, December 26, 1839, with favorable weather and winds which enabled him to crowd sail on the ships, to maintain their line abreast, and to make frequent intercommunications. The weather continuing fair until the close of the month, gave him the fullest opportunity for fitting up each vessel for the ice regions. All openings were calked, and the seams covered with tarred canvas, over which strips of sheet lead were nailed. Casings built around the hatches were deemed sufficient to preserve the temperature within at 50°, which the Commander believed best adapted to their circumstances, and which would prevent the injurious effects otherwise received by those who would pass suddenly from below to the deck; he thought it more important to keep the air dry than warm.

January 1, 1840, was a day usually termed, both on sea and shore, a weather breeder; by midnight the weather became misty; the tender,

"Flying Fish," was lost sight of not to be again seen until the squadron returned to Sydney. The "Peacock" also was separated on the 3d. On the 5th the "Vincennes" and "Porpoise" were in lat. $53^{\circ} 30' S.$, and on the 8th in lat. $55^{\circ} 38' S.$, on the 9th in lat. $57^{\circ} 15' S.$, long. $162^{\circ} 30' E.$ This last-named position was near the site of Emerald Isle; neither the island nor any indications of land, however, being seen, the Commander inferred that the island does not exist in the locality where it is laid down on the charts.

ICE ISLANDS AND BERGS.

Ice islands and bergs now became so numerous as to compel the ships occasionally to change their course. The bergs showed within them large cavities worn by the sea in their perpendicular sides, the plane surfaces of some being inclined to the horizon. As the number increased the sea became smoother and there was no apparent motion, but between 8 and 9 P. M. of the 11th, the ship passed a low point of ice into a large bay, and within an hour afterward reached its extreme limits, a compact barrier of ice enclosing large bergs. The position was lat. $64^{\circ} 11' S.$, long. $164^{\circ} 30' E.$, the variation 22° East. The barometer stood at 29.20 inches; the temperature of the air 33° , of the water 32° . A thick fog set in, shutting out the view beyond a ship's length. But on the 16th the "Vincennes" made frequent tacks to gain as much southing as possible, the report from the look-out at sunset having given promise of a new opening.

"The ship," says Lieutenant Wilkes, "had rapid way on her and was much tossed about, when in an instant all was perfectly still and quiet; the transition was so sudden that many were awakened by it from sound sleep, and all well knew from the short experience we had had, that the cessation of the sound and motion usual at sea, was a proof that we had run within a line of ice, — an occurrence from which the feeling of great danger is inseparable. The watch was called by the officer of the deck, to be in readiness to execute such orders as might be necessary for the safety of the ship. Many of those from below were seen hurrying up the hatches, and those on deck straining their eyes to discover the barrier in time to avoid accident. The ship still moving rapidly along, some faint hope remained that the bay might prove a deep one, and enable me to satisfy my sanguine hopes and belief relative to the land.

"The feeling is awful, and the uncertainty most trying, thus to enter within the icy barrier blindfolded, as it were, by an impenetrable fog, and the thought constantly recurring that both ship and crew were in imminent danger; yet I was satisfied that nothing could be gained but by pursuing this course. On we kept, until it was reported to me, by attentive listeners, that they heard the low and distant rustling of the ice; suddenly a dozen voices proclaimed the barrier to be in sight just ahead. The ship, which a moment before seemed as if unpeopled, from the stillness of all on board, was instantly alive with the bustle of performing the evolutions necessary to bring her to the wind, which was unfavorable to a return on the same track by which we had entered. After a quarter of an hour, the ice was again made ahead, and the full danger of our situation realized. The ship was certainly embayed; and although the extent of sea room to which we were limited, was rendered invisible by the dark and murky weather, yet that we were closely circumscribed was evident from having made the ice so soon on either tack, and from the audible rustling around us. It required several hours to extricate the ship from this bay.

"Few are able to estimate the feelings that such an occasion causes to a Commander, who has the responsibility of the safety of ship and crew operating as a heavy weight upon his heart, and producing a feeling as if on the verge of some overwhelming calamity. All tends to satisfy him that nothing could guide him in safety through, or shield from destruction those who have been entrusted to his charge, but the hands of an all-wise Providence."

On the day last named the three vessels were in long. 157° 46' E., again within a short distance of each other. Captain Hudson, of the "Peacock," after his separation had fortunately made MacQuarie Island on the 10th, where he put up the pointed signal, made experiments, and collected specimens. Passed Midshipman Eld found the sides of the rugged hills literally covered with myriads of birds. Passing a deep fissure in the rocks he soon heard such a din of squeaking, squalling, and gabbling, that it was impossible to hear one's self speak, and found his presence so displeasing that they snapped at him, shaking and pinching his flesh so violently as to make him stand upon the defensive. Collecting a number of birds and a few penguin eggs about the size of a goose egg, he was further surprised by a visit of two albatrosses, who deliberately flew away with two of the eggs in their beaks in spite of all his efforts to prevent them. He says, "These penguins are the *Eudyptes chrysocoma*; they are from sixteen to twenty inches in height, with white breast and nearly black back, the rest being of a dark olive color, with the exception of the head, which is adorned on

each side with four or five yellow feathers, three or four inches long, looking like graceful plumes. The birds stand erect in rows, which gives them the appearance of Liliputian soldiers. The sight was novel and beautiful, and had it not been for the gabble,—enough to deafen me,—I could have stayed much longer.” At a subsequent landing on the coast Mr. Eld succeeded in taking a king penguin of enormous size, viz. ; from tip of tail to the bill, forty-five inches; across the flippers, thirty-seven inches; and the circumference of the body, thirty-three inches. He was taken after a truly sailor-like fashion, by knocking him down. The bird remained quite unmoved on their approach, or



PENGUIN.

rather showed a disposition to come forward to greet them. A blow with the boat hook, however, stunned him, and before his recovery he was well secured. He showed, on coming to himself, much resentment at the treatment he had received, not only by fighting, but by an inordinate noise. He was in due time preserved as a specimen to grace the collection at Washington. In his craw were found thirty-two pebbles, from the size of a pea to

that of a hazelnut. The quartermaster of the “Peacock” secured a large species of penguin and some green paroquets having a large red spot on the head, a purple spot at the root of the bill and a straight beak.*

* Sir C. Wyville Thomson, chief of the scientific staff of H. M. S. “Challenger,” says of the Penguins and their retreats: “The well-known tussock-grass of the Falklands forms a dense jungle. The root-clumps or ‘tussocks’ are two or three feet in width and about a foot high, and the spaces between them one to two feet wide. The tuft of thick grass stems,—seven or eight feet in height,—rises strong and straight for a yard or so, and then the culms separate from one another and mingle with those of the neighboring tussocks. This makes a brush very difficult to make one’s way through, for the heads of grass are closely entangled together on a level with the face and chest. In this scrub one of the crested penguins, probably *Eudyptes chrysocoma*, called by the sealers, in common

THE NORTH PACIFIC ALBATROSS.

The species of this remarkable bird named by Audubon *Diomedea nigripes*, the black-footed albatross, is spoken of by Mr. E. W. Nelson, Naturalist of the U. S. Revenue Steamer "Corwin," as follows:—

"The 'gony,' as this bird is called on the North Pacific, is an abun-

with other species of the genus *Eudyptes*, the 'rock-hopper,' has established a rookery. From a great distance, even so far as the hut or the ship, one could hear an incessant noise like the barking of a myriad of dogs in all possible keys, and as we came near the place, bands of penguins were seen constantly going and returning between the rookery and the sea. All at once, out at sea, one hundred yards or so from the shore, the water is seen in motion, a dark red beak and sometimes a pair of eyes appearing now and then for a moment above the surface. The moving water approaches the shore in a wedge shape, and with great rapidity. A band of perhaps from three to four hundred penguins scramble out upon the stones, at once exchanging the vigorous and graceful movements and attitudes for which they are so remarkable while in the water, for helpless and ungainly ones, tumbling over the stones, and apparently with difficulty assuming their normal position, upright on their feet—which are set far back—and with their fin-like wings hanging in a useless kind of way at their sides. When they have got fairly out of the water, beyond the reach of the surf, they stand together for a few minutes *drying* and *dressing* themselves and talking loudly, apparently congratulating themselves on their safe landing, and then they scramble in a body over the stony beach,—many falling and picking themselves up again with the help of their flappers on the way, and make straight for one particular gangway into the scrub, along which they waddle in regular order up to the rookery. In the meantime a party of about equal number appear from the rookery at the end of another of the paths. When they get out of the grass on to the beach they all stop and talk and look about them, sometimes for three or four minutes. They then with one consent scuttle down over the stones into the water, and long lines of ripple radiating rapidly from their place of departure are the only indications that the birds are speeding out to sea. The tussock-brake, which in Inaccessible Island is perhaps four or five acres in extent, was alive with penguins breeding. The nests are built of the stems and leaves of the *spartina*, in the spaces between the tussocks. They are two or three inches high, with a slight depression for the eggs, and about a foot in diameter. The gangways between the tussocks, along which the penguins are constantly passing, are wet and slushy, and the tangled grass, the strong ammoniacal smell, and the deafening noise, continually penetrated by loud separate sounds which have a startling resemblance to the human voice, make a walk through the rookery neither easy nor pleasant.

"The penguin is thickly covered with the closest felting of down and feathers except a longitudinal band, which in the female, extends along the middle line of the lower part of the abdomen, and which at all events in the breeding season, is without feathers. The bird seats herself almost upright upon her eggs, supported by the feet and the stiff feathers of the tail, the feathers of the abdomen drawn apart and the naked band directly applied to the eggs, doubtless with the object of bringing them into immediate contact with the source of warmth. The female and the male sit by turns; but the featherless space, if

dant bird over this entire stretch of the ocean. It takes company with a vessel on its leaving San Francisco, and follows it to the neighborhood

present, is not nearly so marked in the male. When they shift sitters they sidle up close together, and the change is made so rapidly that the eggs are scarcely uncovered for a moment. The young, which are hatched in about six weeks, are curious-looking little things covered with black down.

"There seems to be little doubt that penguins properly belong to the sea, which they inhabit within moderate distances of the shore, and they only come to the land to breed and moult, and for the young to develop sufficiently to become independent. But all this takes so long that the birds are practically the greater part of their time about the shore. We have seen no reason as yet to question the old notion that their presence is an indication that land is not very far off.

"*Eudyptes Chrysocoma* is the only species found in the Tristan d'Acunha group. The males and females are of equal size, but the males may be readily distinguished by their stouter beaks. From the middle of April till the last week in July there are no penguins on Inaccessible Island. In the end of July the males begin to come ashore; at first in twos and threes, and then in larger numbers, all fat and in the best plumage and condition. They lie lazily about the shore for a day or two, and then begin to prepare the nests. The females arrive in the middle of August, and repair at once to the tussock-brake. A fortnight later they lay two, rarely three, eggs, pale blue, very round in shape, and about the size of a turkey's egg. It is singular that one of the two eggs is almost constantly considerably larger than the other. One or the other of the old birds now spends most of its time at sea, fishing, and the young are fed, as in most sea-birds, from the crop of the parents. In December young and old leave the land, and remain at sea for about a fortnight, after which the moulting season commences. They now spread themselves about the cliffs and along the shore, often climbing in their uncouth way, into places which one would have imagined inaccessible to them. Early in April they all take their departure."

Of the Albatross he says: "There are three species of albatross on Inaccessible Island: the wandering albatross, *Diomedea exulans*; the mollymawk, which appears to be here, *D. Chlororhyncha*, though the name is given by the sealers to different species, — certainly further south to *D. Melanophrys*; and the piew, *D. fuliginosa*. About two hundred couples of the wandering albatross visit the island. They arrive and alight singly on the upper plateau early in December, and build a circular nest of grass and clay, about a foot high, and two feet or so in diameter, in an open space free from tussock grass, where the bird has room to expand his wonderful wings and rise into the air. The female lays one egg in the middle of January, about the size of a swan's, white with a band of small brick-red spots round the wider end. The great albatross leaves the island in the month of July.

Lieutenant Spry, R. N. of the "Challenger," writing of this same visit, says that the whole of the wet, sodden flat lands was studded with large white albatrosses sitting on their nests. These magnificent birds covered the ground in great numbers. It was evidently the commencement of the breeding season, as few eggs were obtainable. "These splendid birds weighing twenty pounds, and measuring from eleven to twelve feet from tip to tip of wing, seen to such advantage while in their glory at sea as they sweep so gracefully through the air, are altogether out of their element on shore. In order to rise again after settling on the land, they are obliged to run some distance before they obtain sufficient velocity for the air to get under their wings and allow them to feel themselves masters of the situation."

of the Aleutian Islands, where it disappears; and, as we noted in October, 1881, soon after we left Ounalaska these birds appeared and were with us continually in pleasant or stormy weather, until we approached San Francisco. The majority seen were young, the light-colored birds being observed only at intervals. Nearly all are dark, smoky brown, but here and there may be seen one with a ring of white feathers



THE ALBATROSS.

around the rump at the base of the tail; and all have a marked line of white surrounding the base of the bill. Those with the white on the tail almost invariably have a white spot under each eye. The graceful evolutions of these birds afford one of the most pleasing sights during a voyage across the North Pacific, and they are a source of continual interest during the otherwise monotonous passage." The black-footed albatross and another species, *Diomedea Brachyura*, the short-tailed, appear to wander occasionally even into the Arctic Ocean. (Cruise of the "Corwin," of 1881.)

The graceful evolutions of the bird attract the mariner in both the Northern and the Southern Seas.

The lines of Coleridge seem to come unbidden before one, —

“The ice was here, the ice was there,
The ice was all around,
It crack’d, and growl’d, and roar’d and howl’d,
Like noises in a swound!

“Till a great sea-bird called the Albatross came through the snow-fog, and was received with great joy and hospitality.”

At length did cross an Albatross
Thorough the fog it came;
As if it had been a Christian soul,
We hailed it in God’s name.

It ate the food it ne’er had eat.
And round and round it flew;
The ice did split with a thunder-fit;
The helmsman steered us through!

“And lo! the Albatross proveth a bird of *good* omen, and followeth the ship as it returned northward through fog and floating ice.”

And a good south wind sprung up behind,
The Albatross did follow.
And every day, for food or play,
Came to the mariners’ hollo!

In mist or cloud, on mast or shroud,
It perched for vespers nine;
Whiles all the night, through fog-smoke white,
Glimmered the white moonshine.”

— *Rhyme of the Ancient Mariner.*

LAND DISCOVERED.

When the three ships lay near each other, January 16, before the occurrence of the gale which has been noted, albatrosses, Cape pigeons, and petrels were seen in large numbers; and appearances, believed at the time to be land, were visible from all the three ships. “The comparison of these observations,” says Wilkes, “when taken in connection with the more positive proofs of its existence, has left no doubt that the appearance was not deceptive. From this day, therefore, we date the discovery which is claimed for the squadron.” The Lieutenant made a sketch of what he himself saw, giving this sketch in his Narrative of the Expedition; on the “Porpoise,” Lieutenant-Commanding Ringgold reported that after an hour’s close observation to see whether the sun in his decline would change the color of the large, dark object seen over the field-ice, and resembling a mountain, it remained the same

with a cloud over it like that which hovers over high land. He was thoroughly of the opinion that it was an island surrounded by ice-fields. On the "Peacock" also, Passed-Midshipmen Eld and Reynolds reported to Hudson land seen from the masthead,—a statement afterward renewed on their return to the United States. "The mountains could be distinctly seen stretching over the ice to the southwest." Two peaks especially were distinctly visible; the sun shone brightly upon ridge after ridge.

On the 19th land was again visible from the "Vincennes," and Lieutenant (late Admiral) Alden reported it twice to Lieutenant Wilkes. The ships were in lat. $66^{\circ} 20' S.$, long. $154^{\circ} 30' E.$; at 3.30 P. M. land seen by all on board the "Peacock" appeared to be three thousand feet in height. Shortly after this interesting event, the "Peacock" made a narrow escape from entire destruction, striking, on the 24th, with her larboard quarter on an ice floe, with such force as to carry away her spanker boom, stern boat, spar-deck bulwarks, knee binding the davit to the taffrail, and her stanchions as far as the gangway. Happily, rebounding from the shock, she cleared the ice, barely, however, escaping a greater danger by the falling of a mass of ice and snow which would have crushed her had she not been a half length out of the line of the berg. Hudson was compelled to return north to Sydney.

January 23d, the "Vincennes" again steered south, entering an open water space, but by midnight reached its limit. The appearance of land was observed on either hand east and west. But foiled in this attempt to reach what Wilkes now believed to be a continent, he stood out of the bay, naming it Disappointment Bay, by which name it still appears on the charts. A gale of unusual violence prevailing from the southwest and southeast during thirty hours of the days January 29 to 31, the Medical Officers of the "Vincennes" after its moderating, found the sanitary condition of the ship such as to demand of them a special report which they made to the Commander, with the opinion that a few more days of such exposure as the crew had already undergone would reduce their number, by sickness, to such an extent as to hazard the safety of the ship and the lives of all on board. The Commander asked the opinion of the ward-room officers on this judgment

of the surgeons; but not deeming that there was sufficient cause for departing from his original plan of passing along to the rendezvous appointed for the squadron, again steered south, and continued his course along the icy barrier.

February 2, the "Vincennes" and the "Porpoise" were steering again to the southward among ice islands, the land still in sight and with the same lofty appearance as before. Icy cliffs from one hundred and fifty to two hundred feet in height bounded it on all sides; there was no appearance whatever of rocks; all was covered with ice and snow. No soundings were had with one hundred and fifty fathoms, although the water was much discolored, in recording which, Wilkes says, "The badness of the sea-line was a great annoyance to us, for deeper soundings would probably have obtained bottom. The land still trended to the west as far as the eye could reach, and continued to exhibit the same character as before." The longitude was now $137^{\circ} 02'$ E., lat. $66^{\circ} 12'$ S., the magnetic declination westwardly. Within the last few days the sick list increased to twenty; ulcers caused by the least scratch were prevalent.

On the 7th, many whales, penguins, flocks of birds, and some seals were reported; the outline of high land could be well distinguished beyond the perpendicular icy barrier. At the trend of the land here, Wilkes named a point Cape Carr, after the first Lieutenant of the "Vincennes," its position was long. $131^{\circ} 40'$ E., lat. $64^{\circ} 49'$ S.

"On the 9th," says Wilkes, "we had the finest day we had yet experienced on this coast; the wind had veered from the east to the southwest, and given us a clear, bracing, and wholesome atmosphere. The barrier exhibited the same appearance as yesterday. Our longitude was $125^{\circ} 19'$ E., lat. $65^{\circ} 08'$ S., variation $32^{\circ} 45'$ westerly. The current was tried but none found; the pot was only visible at five fathoms, the color of the water a dirty green; the dip sector gave $3' 15''$. I never saw a clearer horizon, or one better defined, than we had to the northward. The icy barrier really was beautiful. At midnight we had a splendid display of the aurora Australis, extending all around the northern horizon from west-by-north to east-northeast. Before its appearance a few clouds only were seen in the southeast, on which

the setting sun cast a red tint that barely rendered them visible. The horizon, with this exception, appeared clear and well defined. The spurs or brushes of light frequently reached the zenith, converging to a point near it.

“Although no clouds could be seen in the direction of the aurora before or after its appearance, yet when it was first seen, there appeared clouds of the form of massive cumuli, tinged with pale yellow, and behind them arose brilliant red, purple, orange, and yellow tints, streaming upwards in innumerable radiations, with all the shades that a combination of these colors could effect. In its most brilliant state it lasted about twenty minutes. The gold-leaf electrometer was tried but without being affected; the instrument, however, was not very sensitive. Being somewhat surprised at the vast mass of cumuli which appeared during the continuance of the aurora, I watched after its disappearance until daylight, but could see only a few clouds; I am therefore inclined to impute the phenomenon to some deception caused by the light of the aurora. The apparent altitude of these clouds was 8° .

“Running close along the barrier, which continued of the same character, although more broken than yesterday, we saw an appearance of land, although indistinctly, to the southward. The water was of the same color here as before, and the wind being from the southeast, we made some progress, and found ourselves in long. $122^{\circ} 35'$ E., lat. $65^{\circ} 27'$ S., the variation had now increased to $44^{\circ} 38'$ westerly. No aurora was seen this night, although it was looked for anxiously.

“The barometer had been stationary at 29.080 in. for the last three days; it now began to fall; the temperature of the air was 31° , of the water 32° . The fall of the barometer was soon followed by snow and thick weather. The trending of the barrier had been southwest-by-west, and a good deal of ice-floe had been met with, which we ran through. The sea was quite smooth, and many icebergs were enclosed in the barrier which was very compact, and composed of flat fields.

“During the 12th we had pleasant weather, and at 2 A.M. filled away. At 8 A.M. land was reported to the southwest. Keeping along the barrier, and increasing our latitude, I again had hopes of getting near

the land. We passed through great quantities of large floe-ice until 1 P.M. when the solid barrier prevented our further progress. Land was now distinctly seen from eighteen to twenty miles distant, bearing from south-southeast to southwest—a lofty mountain range covered with snow, though showing many ridges and indentations. I laid the ship to for three hours, in hopes of discovering some opening or movement in the ice, but none was experienced. I tried the current, but found none. The water was of a dark, dirty green. We sounded with the wire line in two hundred and fifty fathoms, and found no bottom. The temperature at that depth was $30\frac{1}{2}^{\circ}$, of the air 31° . The barrier had in places the appearance of being broken up, and we had decreased our longitude to $112^{\circ} 16' 12''$ E., while our latitude was $64^{\circ} 57'$ S. This puts the land in about $65^{\circ} 20'$ S., and its trending nearly east and west. The line of the icy barrier was generally uniform, although it was occasionally pierced with deep bays.

“The 14th was remarkably clear and the land very distinct. By measurement we made the extent of coast of the Antarctic Continent then in sight seventy-five miles, and by approximate measurement three thousand feet high. On running in, several icebergs were passed, which were greatly discolored with earth; on effecting a landing on an ice island, the party from the ships’ boats found embedded in it gravel, sand, mud, and boulders, the largest of which was about five or six feet in diameter. Many specimens were obtained, and it was amusing to see the eagerness and desire of all hands to possess themselves of a piece of the Antarctic Continent.” On the 17th further progress to the westward was cut off and the squadron obliged to retrace its steps, a large number of whales were seen of the fin-back species and of extraordinary size; their close approach was proof that they had never been exposed to the pursuit of skilful hunters. Their blowings resembled that of a number of locomotives.

The Aurora Australis again appeared in most brilliant form, rays from the horizon to the zenith in all directions in the most brilliant coruscations; others proceeding as if from a point in the zenith, flashed in brilliant pencillings of light, like sparks of electric fluid in *vacuo*, and reappeared again to vanish; forming themselves into one

body, like an umbrella, or fan, shut up; they showed all the prismatic colors at once in quick succession. So remarkable was the phenomenon that even the sailors were constantly exclaiming in admiration of its brilliancy. The best position in which to view it was by lying flat upon the deck, and looking up. The electrometer was tried, but no effect perceived. The star Canopus was in the zenith at the time, and though visible through the aurora, was much diminished in brightness. On this night also the moon was partially eclipsed.

Having reached 97° east, where the "Vincennes" found the ice trending to the northward, the ship followed it closely to within a few miles of the position where Cook was stopped by the barrier in 1773. The weather was now stormy, and the season far advanced; Wilkes bore up for Sydney, where he learned that news had been received of the discovery by the English sealer, "Bellamy," of land, in long. 165° E., south of and near the position where the "Vincennes" had struck the icy barrier. He also heard that Captain Sir James Ross was expected from England, and, for the benefit of his exploring squadron, forwarded to Captain Ross a tracing of the chart prepared as the American squadron had passed along the barrier, laying down the land not only where it had actually been determined to exist, but those places in which every appearance denoted its existence, forming almost a continuous line from long. 160° to 97° East. This chart, with Wilkes' notes and experience, and the supposed position of Bellamy's Islands, was received by Ross at Hobart Town some months previous to his going South. In connection with the statement of this fact, Wilkes seems very justly to have expressed his surprise that Captain Ross afterward should have asserted that he had run over a clear ocean where he (Wilkes) had laid down the land—Bellamy's—which an examination of the chart would have assured him had never been claimed by the "Vincennes." He also remarks that "on reference to Captain Ross's chart and track it will be seen that he did not approach near enough to our positions either to determine errors or verify results, and without imputing any intentional misrepresentation it would seem somewhat unusual that on the Captain's chart the discoveries of others (though of much less importance) should be misrepresented, while those of the American

Expedition were omitted, when it is known he was in possession of our operations more fully than those of others."

It is to be regretted that this controversy occurred, as well as the reported declining by the French discovery ships under D'Urville, to recognize in this region the flag of the U.S. Steamer, "Peacock;" it was thought still more remarkable even in England that Sir James Ross should have said that he "would have expected the national pride of both the American and French Commanders to have caused them rather to choose any other path for penetrating southward than the place for the exploration of which *his* expedition was preparing." Referring to this last statement the *North British Review* (vol. viii. 1847-48) says: "We cannot concur with our excellent author in blaming either the French or American Commander. The British Expedition might never have sailed, or might never have reached its destination; and in such an event, the commanders could never have justified themselves to their respective governments, had they omitted, from any feelings of delicacy, to take the best path to the Antarctic Pole." The tribute from the Royal Geographical Society, London, which here follows, is an example of the generous and just sentiments entertained by that society and is expressive of the general feeling of explorers and geographers, and Sir James Ross himself has testified the merit of the U.S. Expedition and of its commander in the language which follows the address. Mr. W. Hamilton, who, as President of the Royal Geographical Society, May 22, 1848, presented to the U.S. Minister, Mr. Bancroft, the gold medal awarded by the society to Captain Wilkes, said to the society:—

"GENTLEMEN, — You have just heard the announcement that the Council has awarded the Founder's medal to Captain Wilkes, of the United States Navy, for the zeal and intelligence with which he carried out the Scientific Exploring Expedition entrusted to him by the Government of the United States in the years 1838-1842; and for the volumes which he has published, detailing the narrative of that expedition.

"It therefore becomes my duty to endeavor to give you some account of the performances of the gallant officer, and of the services which he has rendered to the progress of geography. It must be remembered that this was the first expedition ever fitted out by the Government of the United States for scientific purposes. Greater difficulties must, therefore, be supposed to have attended its organization

than would have been the case with more experience; on the other hand, merit the of success is proportionally increased.

"The expedition left the Hampton Roads on the 17th of August, 1838, and its first scientific operation was the establishment of an observatory at Orange Harbor, in Terra del Fuego; here some of the vessels remained while others were detached to the westward, and Captain Wilkes himself proceeded on the 25th of February to the South, for the purpose of exploring the southeast side of *Palmer's Land*. After reaching lat. $63^{\circ} 25' S.$, finding the season too far advanced to make any progress against the ice, he turned his ship's head to the North, and the whole squadron was soon collected at Valparaiso. Here another observatory was established. A scientific party visited the bank of snow from which the city is supplied, on one of the outlying ranges of the Cordilleras, the principal heights of which rose nearly four thousand feet above them; others visited the mines of Chili. They then proceeded to the coasts of Peru, and thence, after a visit to the interior and to the ruins of Pachacamac, commenced their explorations in the Pacific.

"On the 26th of December, 1839, they left Sydney, and first fell in with the ice on the 10th of January, 1840, in lat. $61^{\circ} 8' S.$, and long. $162^{\circ} 32' E.$; and on the 11th some of the officers were confident they saw indications of land. Captain Wilkes does not rely much on this; but on the 16th these appearances became more positive, and on the 19th they distinctly saw land in long. $154^{\circ} 30' E.$, lat. $66^{\circ} 20' S.$ Captain Wilkes, however, only dates the discovery which he claims for his expedition from the land seen on the 16th. I mention this the more anxiously on this occasion on account of the controversy which has arisen between him and Sir James Ross who sailed over the spot where land was supposed to have been seen on the 11th; to this, however, I wish to allude as lightly as possible, convinced as I am, that both these gallant officers have only been anxious to establish the truth, and to advance the cause of science. Undoubtedly on the tracing which Captain Wilkes furnished to Sir James Ross, the land supposed to have been seen on the 11th of January is sketched in, and, as a measure of precaution, it was perhaps prudent in Captain Wilkes so to do; it would have been more satisfactory if he could have stated to Sir James Ross, as he had done in his published account, on what slight and imperfect evidence its existence in that position was laid down. After continuing his explorations of the Antarctic Continent as far to the westward as long. $97^{\circ} E.$, Captain Wilkes finding his provisions short and the season far advanced, turned his ship's head to the North and quitted these frozen latitudes. . . . I regret that it is impossible, within the limits of this address, to do justice to the contents of the five volumes in which Captain Wilkes has described the progress of the expedition; but I trust I have done enough to show that the exertions of Captain Wilkes and the results of the expedition intrusted to him, have in every respect been such as to entitle him to the highest mark of distinction which it is in the power of this society to bestow."

In his "Voyage of Discovery and Research in the Southern and Antarctic Regions," Vol. I., p. 116, Sir James Ross says:—

"The arduous and persevering exertions of the American Exploring Expedition, continued throughout a period of more than six weeks under circumstances of great peril and hardship, cannot fail to reflect the highest credit on those engaged in the enterprise, and excite the admiration of all who are in the smallest degree acquainted with the laborious nature of an icy navigation."

Ross was more successful than either D'Urville or Wilkes. The French commander had been the first to propose an Antarctic Expedition. Ross's squadron was better fitted for ice navigation, and the circumstances attending the date of his cruise were more favorable. He penetrated to $78^{\circ} 11'$, discovering what he named Victoria Land, and following its coast from 70° to 79° S. lat. On its northern extremity he discovered two active volcanoes,—Mount Erebus, 12,360 feet, and Mount Terror, 10,880 feet in height,—together with other elevations along a coast, steep, rocky, and, like nearly all the Antarctic lands, utterly bare of all but ice or snow. He assigned the position of the S. Magnetic Pole to lat. $75^{\circ} 5' \text{ S.}$; long. $154^{\circ} 8' \text{ E.}$ * His whole line of discovery retains a place on the admiralty charts.

* For the better information of the general reader the following notes are given in regard to the Dip and the Variation of the Needle. In regard to the dip, "Robert Norman first discovered in 1576 that if a bar of steel be supported on its centre of gravity so that it will remain necessarily in any position in which it is placed, it will, after having been magnetized, swing into the magnetic meridian and place its length at an angle with the horizon. In the northern magnetic hemisphere the north end of the needle points downward, making, for example, at New York, an angle of about 73° with the horizon; in the southern magnetic hemisphere the south pole of the magnet points downward. This phenomenon is called the *dip of the needle*. We shall proceed to examine the behavior of such a needle when it is carried over the surface of the earth. Proceeding north and to the west of New York, we shall observe the north end of the needle dipping more and more, until, having reached a N. lat. of $70^{\circ} 5'$, and a W. long. of $96^{\circ} 46'$, we may have attained the position where Commander James Ross in 1832 first observed the needle taking an exactly perpendicular position. This point is called the *north magnetic pole* of the earth. It is inferred from observations on the dip in the Southern Hemisphere that a *southern magnetic pole*—where the needle will be vertical with its south pole downward—exists about lat. S. $70'$, and long. 125° E. of Greenwich. This would place this pole in the territory discovered by our countryman, Wilkes. No explorer, however, has reached the south magnetic pole."—*Johnson's Encyclopedia*.

In regard to the variation of the compass, it is matter of observation that the magnet when delicately suspended is always shifting its direction. The declination is called west when the north end of the magnet points to the west of true north, and east when

Of the reported discovery of an Antarctic Continent by Wilkes the line will be found laid down on the Antarctic charts of the U. S. Hydrographic Office, as taken from his Official Report. Geographers at present, however, believe that in place of the existence of an unbroken continental coast line there is a chain of islands in this quarter of the Antarctic extending from the 95th to the 150th meridian. As in the case of Palmer's Land, which has been referred to, so in regard also to the discoveries by Wilkes, very little credit is given on the English charts.

RESEARCHES AND COLLECTIONS.

Whatever impartial judgment may be passed upon these reported discoveries as to their extent or their geographical value in such almost unapproachable regions, the scientific researches and the extensive collections made by the expedition are of much practical value to science and to navigation. The late Professor Henry in his Annual Report of the Smithsonian Institution to the Board of Regents for the year 1871, while acknowledging the receipt of several valued collections of specimens for the National Museum (among them those donated by Captain C. F. Hall from his expedition of 1864-69) says of the collection brought home by Lieutenant Wilkes, that "the basis of the National Museum is the collection of specimens of the United States Exploring Expedition under Captain, now Admiral, Wilkes, originally deposited in the Patent Office, and transferred to the Smithsonian in 1858." In his Report for the year 1867, when enumerating the collections in the Museum at that date, he had said: "The collections made by the Naval Expedition, 1838-42, are supposed greatly to exceed those of any other similar character fitted out by any government; no published series of results comparing in magnitude with that issued under the direction of the Joint Library Committees of Congress. The collec-

it points east of true north. Observations for this variation from the true north, are a most important element in navigation, the want of these having doubtless wrecked many a misguided ship. The variation at Boston in 1877 was $11^{\circ} 36'$ W.

For a most interesting and full historical and mathematical discussion of both dip and variation, see Appendix 12, "Report of U. S. Coast and Geodetic Survey for 1882." — C. A. Schott.

tions made embrace full series of the animals, plants, minerals, and ethnological material of the regions visited. They not only afford a basis for a comparison of the different modes of life and stages of advancement among existing tribes, but an important means of determining the ethnological relations of the natives of the present day to those whose ancient remains lie thickly strewn over our whole continent. For example, implements of stone and of bone are almost everywhere found, the workmanship of races that *have long since disappeared*, and of which the use would be difficult of determination, were not similar implements, as to form and material, found in actual use at the present day among savages, particularly those inhabiting the various islands of the Pacific Ocean."

Professor Henry is at pains to state that, "the Museum itself is not an Institution having for its object the gratification of the merely curious, but is intended to embrace a collection of specimens of nature and art which shall exhibit the natural resources and industries of the country, or to present at one view the materials essential to the condition of high civilization which exists in the different States of the American Union; to show the various processes of manufacture which have been adopted by us, as well as those used in foreign countries; in short, to form a great educational establishment by means of which the inhabitants of our own country, as well as those of foreign lands who visit our shores, may be informed as to the means which exist in the United States for enjoyment of human life in the present, and the improvement of these means in the future." In this connection the reader is referred to the recent Reports of the Smithsonian now in charge of Professor S. F. Baird, for an account of the educational character of this museum in its increasing departments. A recent arrangement made under the sanction of Secretary Chandler, assigns some of the junior Naval Officers to temporary duty at the Museum; a most valuable training being thus provided for their future usefulness as explorers in the several branches of science, contributions to which they will be led to secure when at sea and in foreign lands. The total number of specimens in the Museum, not yet classified, already exceeds 30,000.

RESULTS OF THE CRUISE REPORTED BY LIEUTENANT WILKES.

Of the chief results of the Expedition, Lieutenant Wilkes in his Narrative and in an Address delivered June 20, 1882, before the National Institute, the predecessor of the Smithsonian Institution, thus speaks:—

“The evidence that an extensive continent lies within the icy barrier must have appeared in the account of my proceedings, but will be, I think, more forcibly exhibited by a comparison with the aspect of other lands in the same southern parallel. Palmer’s Land, for instance, which is in like manner invested with ice, is so at certain seasons of the year only, while at others it is quite clear, because strong currents prevail there, which sweep the ice off to the northeast. Along the Antarctic continent for the whole distance explored, which is upwards of one thousand five hundred miles, no open strait is found. The coast, where the ice permitted approach, was found enveloped with a perpendicular barrier, in some cases unbroken for fifty miles. If there was only a chain of islands, the outline of the ice would undoubtedly be of another form; and it is scarcely to be conceived that so long a chain could extend so nearly in the same parallel of latitude. The land has none of the abruptness of termination that the islands of high southern latitude exhibit; and I am satisfied that it exists in one uninterrupted line of coast from Ringgold’s Knoll, in the east, to Enderby’s Land in the west; that the coast (at long. 95° E.) trends to the north, and this will account for the icy barrier existing, with little alternation, where it was seen by Cook in 1773. The vast number of ice islands conclusively points out that there is some extensive nucleus which retains them in their position; for I can see no reason why the ice should not be disengaged from islands, if they were such, as happens in all other cases in like latitudes. The formation of the coast is different from what would probably be found near islands, soundings being obtained in comparatively shoal water; and the color of the water also indicates that it is not like other southern lands, abrupt and precipitous. This cause is sufficient to retain the huge masses of ice by their being attached by their lower surfaces instead of their sides only.” Of the scientific work of the Expedition, he says:—

“At all the important points of the cruise an observatory was established, and the longitude determined by moon-culminating stars in connection with similar observations at Cambridge (Mass.) University, by Professor Bond, and at Washington, by Lieutenant Gilliss. The latitude was deduced by circummeridian observations of the sun and stars; meridian distances were carried throughout the route by chronometers from and to well established points; every opportunity was taken to determine the true position of islands, reefs, etc., by observations made on shore; the labors in hydrography were extensive; in all the explorations, the constant aim was to obtain useful results; particular attention was paid to ascertain whether wood, water, and what kind of refreshments (if any) could be had; anchorages were looked for and surveyed; and the character of the natives and the kind of treatment that may be expected from them.

“In magnetism, observations were made at fifty-seven stations, for dip and intensity; and at every point where the ships remained a sufficient time, for diurnal variation; the dip was observed at sea frequently, and the ship's head always kept north and south whilst the observations were making; very many attempts were made to observe the intensity at sea, both by horizontal and vertical vibrations, but Wilkes was never able to satisfy himself with the results, whatever others may have done.

“For the determination of the Southern Magnetic Pole, he had variation observations from 35° easterly variation to 59° west, between the longitudes of 97° and 165° east, nearly on the same parallel of latitude; which will give numerous convergent lines through that space for its determination; the greatest dip was $87^{\circ} 30'$. The summit of Mouna Loa, thirteen thousand four hundred feet above the level of the sea, was among the magnetic stations; the pendulums were swung at six stations, one of these at the summit of Mouna Loa and another at its foot; full meteorological journals were kept during the whole cruise — the hours of observation, 3 and 9 P. M., and 3 and 9 A. M.; the temperature at the masthead taken at the same hours; that of the air and water every hour during the cruise, at sea and in port; when in port, thermometers were sunk, and the temperature of springs, wells, and caves taken for the mean temperature of the climate.

"In botany about ten thousand species were obtained, and from three to five specimens of each, all brought or sent home in a dried state. About one hundred specimens of *living plants* were brought home in cases; among them several East India fruits and other plants from that region, supposed to be rarely found in European conservatories.

"In the Geological and Mineralogical Departments, under Mr. Dana, much industry and research were expended; about eleven hundred species of crustacea were figured; among them many new forms illustrative of general anatomy and physiology. In a word, extensive collections of specimens were made in all the Departments of Natural History."

THE COLLECTIONS AND PUBLICATIONS.

By a liberal appropriation, Congress promptly made provisions for the arrangement and preservation of the collections referred to, placing them first in the charge of the Patent Office, and annually appropriating for their care the sum of \$5,000.

By very appreciative further appropriations, the publication of the Narrative of the Expedition was secured in five quarto volumes, and these were at different dates followed by the issue of eleven volumes, exhibiting some of the work done by the several gentlemen of the Scientific Corps. Parts of the work were unfortunately destroyed by fire.

The volumes were published and distributed under special Acts or Resolutions of Congress, primarily to the Libraries of Foreign Governments and to those of the States of the Union. One copy was donated to the Commander of the Expedition, and one to Captain Hudson; the distribution being made from the first, in accordance only with the Reports of the Joint Library Committee, in whose charge the volumes which may remain, still are. The list of all which have been published is as follows (Catalogue of Library of Congress, 1864):

- Vols. 1-5. Narratives. 4to. With Atlas.
- Vol. 6. Ethnography and Philology. 4to. H. Hale.
- Vol. 7. Zoöphytes. 4to. Atlas folio. J. D. Dana.
- Vol. 8. Mammalogy and Ornithology. 4to. Atlas folio. John Cossin.
- Vol. 12. Mollusca and Shells. 4to. Atlas folio. A. A. Gould.
- Vols. 13, 14. Crustacea. 2 vols. 4to. Atlas folio. J. D. Dana.

- Vol. 15. Botany. (Part I.) Phanerogamia. 4to. Atlas folio. Asa Gray.
Vol. 16. Botany. (Part II.) Cryptogamia, Filices, including Lycopodiaceæ and Hydropterides. 4to. Atlas folio. W. D. Brackenridge.
Vol. 20. Herpetology. 4to. Atlas folio. Prepared under the superintendence of Prof. S. F. Baird.
Atlas of Charts from the Surveys of the Expedition. 2 vols. Folio.

A popular edition of the Narrative in five volumes, including also some of the notes of the scientific work, was issued in Philadelphia, under the supervision of Lieutenant Wilkes. This edition can still be procured at the book-stores.

NOTE I. — In his larger edition of the Narrative, Lieutenant Wilkes has some notes on the ice formations in the Antarctic, possessing interest to the general reader as well as to the navigator. He says:—

“Much inquiry and a strong desire has been evinced by geologists, to ascertain the extent to which these ice-islands travel, the boulders and masses of earth they transport, and the direction they take.

“From my own observations and the information I have collected, there appears a great difference in the movements of these masses; in some years, great numbers of them have floated north from the Antarctic circle and even at times obstructed the navigation about the capes. The year 1832 was remarkable in this respect; many vessels bound round Cape Horn from the Pacific, were obliged to put back to Chili, in consequence of the dangers arising from ice; while, during the preceding and following years, little or none were seen; this would lead to the belief, that great changes must take place in the higher latitudes, or the prevalence of some cause to detach the ice-islands from the barrier in such great quantities as to cover almost the entire section of the ocean south of lat. 50° S. Taking the early part of the (southern) spring, as the time of separation, we are enabled to make some estimate of the velocity with which they move; many masters of vessels have met them, some six or seven hundred miles from the barrier, from sixty to eighty days after this period, which will give a near approximation to our results heretofore stated.

“The season of 1839–40 was considered as an open one, from the large masses of ice that were met with in a low latitude, by vessels that arrived from Europe at Sydney; many of them were seen as far north as lat. 42° S.

“The causes that prevail to detach and carry them north are difficult to assign. I have referred to the most probable ones that would detach them from the parent mass in their formation. Our frequent trials of currents, as has been stated, did not give us the assurance that any existed; but there is little doubt in my mind that they do prevail. I should not, however, look to a surface current as being the motive power that carries these immense masses at the rate they move; comparatively

speaking, their great bulk is below the influence of any surface current, and the rapid drift of these masses by winds is still more improbable; therefore I conceive we must look to an under current as their great propeller. In one trial of the deep-sea thermometer, we found the temperature beneath four degrees warmer than the surface. Off Cape Horn, the under temperature was found as cold as among the ice itself; repeated experiments have shown the same to occur in the Arctic regions. From this I would draw the conclusion that changes are going on, and it appears to me to be very reasonable to suppose, that at periods, currents to and from the Poles should at times exist; it is true, we most generally find the latter to prevail, as far as our knowledge of facts extends, but we have not sufficient information to decide that there is not a reflow toward the Pole; the very circumstance of the current setting from the higher latitudes, would seem a good argument that there must be some counter-current to maintain the level of the waters. These masses, then, are most probably carried away in the seasons when the polar streams are the strongest, and are borne along by them at the velocity with which they move; that these do not occur annually may be inferred from the absence of ice-islands in the lower latitudes; and that it is not from the scarcity of them, those who shared the dangers of the Antarctic cruise, will, I have little doubt, be ready to testify; for, although great numbers of them studded the ocean that year, yet the narrative shows that vast numbers were left.

“The specific gravity of the ice varies very much as might naturally be expected; for while some of it is porous and of a snowy texture other islands are in great part composed of a compact, blue-flinty ice. This difference is occasioned by the latter becoming saturated with water, which afterward freezes.

“On the ice there was usually a covering of about two feet of snow, which in places had upon it a crust of ice not strong enough to bear the weight of a man. Those ice-islands, which after having been once seen, were again passed through immediately after a gale, were observed to be changed in appearance; but though for forty-eight hours a severe storm had been experienced, they had not undergone so great a transformation as not to be recognized. They also appeared to have shifted their position with regard to one another, their former bias and tendencies being broken up.

“During our stay on the icy coast, I saw nothing of what is termed pack-ice, — that is pieces forced one upon the other by the action of the sea or currents.”

NOTE II. — The English Admiralty charts show that all along the southern part of the South Atlantic Ocean ice is found, brought by the Antarctic polar currents and reaching different parallels, according to the meridian on which it happens to float, as also according to the season of the year. During the southern summer, from January to March, the icebergs reach the highest points and sometimes are found nearly up to 40° S., between 20° and 25° W.

Admiralty Chart No. 1,241, issued June 50, 1874, is an ICE CHART of the Southern Hemisphere, compiled from the voyages of Cook, Bellingshausen, Weddell, Foster, Biscoe, Balleny, D'Urville, Wilkes, and Ross, the chief explorers from the years 1772

to 1841, and from other sources as late as 1865. The chart has been issued because of the adoption by modern navigators of routes approaching more or less to a great circle course, shortening the distance to and from Australia. The dangers to be apprehended from contact with the ice in these high latitudes is stated to be far greater than has been generally supposed. The vast disrupted masses drifted by the influence of winds and currents to lower latitudes have seriously embarrassed, delayed, and imperilled navigation. "The greatest number of icebergs hitherto sighted," says Commodore Evans, R. N., the compiler of the Chart, "in the tracks of ordinary navigators, have been in the months of November, December, and January, and the least in June and July, the proportions of those seen in these months to the number seen in December being as 1 to 13." The French Sailing Directions of Labrosse, translated by Lieutenant J. W. Miller for U. S. Hydrographic Office, as well as the chart just referred to, give the latitude-limits of floating ice which from April 1 to October 1 is rarely to be found north of lat. 50° S., or even there except between the meridians 148° and 93° W. From October 1, stray bergs sometimes, though rarely, drift as far north as 40° . They are always to be feared during the southern winter, during which they constitute a real danger, and the principal difficulty in making a passage from Australia, New Caledonia, New Zealand, or Tabiti, to Cape Horn. They are, however, most numerous in the southern summer when the nights are short.

Jan. 1, 1867, Captain Guérin of the "St. Paul," sailing between 46° and 47° south, and 4° and 12° east, was completely surrounded by icebergs, the principal of which were from one hundred and sixty to three hundred and thirty feet high. *Nothing had announced their approach*, the thermometer showing no sudden change in their vicinity, and the only peculiarities noticed being thick fogs, the absence of birds, an unusually smooth sea, and some old pieces of wreck. A good ice chart will be found in Steiler's Atlas.

NOTE III. — The general reader will not have failed to notice the difference in the ice formation, found in the Antarctic Ocean from those in the Arctic, and the difference between those of the Greenland Seas and those north of Bering Straits. Bergrs in the Antarctic have been sighted whose height was recorded by responsible captains as from four hundred and twenty to nine hundred and sixty feet. The *extent* of the fields also exceeds that of the bergs in the north; the largest field reported according to Towson (endorsed by Fitzroy), being sixty miles by forty. It was passed by twenty-one ships during the months of January to May. No icebergs exceeding half the height here named have been seen in the Arctic, nor have masses of ice-fields of such extent been met with in the sea north of Bering Strait.

"In another respect the Antarctic bergs exceed those of the North. The coloring of the crevasses, caves, and hollows of the icebergs of the Antarctic regions is of the *deepest* blue, a more powerful color than that seen on the ice of the Swiss glaciers. In the case of the bergs with all their sides exposed, no doubt a greater amount of light is able to penetrate than in glaciers where the light usually enters only at the top." — *Voyage of the "Challenger."*

CHAPTER XIII.

SUMMARY OF THE EXPEDITIONS, BENEFICIAL RESULTS.

THE AMERICAN ARCTIC EXPEDITIONS. — HIGHEST POINTS REACHED. — VALUE OF ARCTIC EXPLORATIONS ENDORSED BY WEYPRECHT, MAURY, HENRY, BACHE, BARROW, AND OSBORN. — METEOROLOGICAL STATIONS IN THE ICE ZONES. — THEIR PURPOSE DISTINCT FROM THE POLAR PROBLEM. — LIEUTENANT WEYPRECHT'S PROPOSITION. — STATIONS UNDER THE INTERNATIONAL COMMISSION RECOMMENDED BY PROFESSOR HENRY. — PRELIMINARY VOYAGE OF THE "FLORENCE." — SHERMAN'S AND KÜMLIEN'S REPORTS. — SIGNAL SERVICE STATION AT LADY FRANKLIN BAY. — UNSUCCESSFUL ATTEMPTS FOR RELIEF. — SIGNAL SERVICE STATION NEAR POINT BARROW. — PRELIMINARY REPORTS. — GEOGRAPHICAL DISCOVERY. — BENEFITS TO THE WHALE FISHERIES. — SMALL NUMBER OF LIVES LOST IN THE EXPEDITIONS. — FURTHER EXPLORATIONS.

IN the first Chapter of this Volume it was said that although the original objects of the Explorations which would be discussed had not been secured, their incidental results have more than compensated for all expenditure of thought and money, and all of exposure and disappointment experienced by the explorers. The record of their labors which has now been made, must confirm, it is believed, this impartial judgment, which certainly is that expressed by some of the ablest and most trustworthy in scientific circles, both at home and abroad. Referring to what has been thus far accomplished in the northern zone, Lieutenant Maury has said: "Voyages of discovery, with their fascinations and their charms, have led many a noble champion both into the torrid and frigid zones; and notwithstanding the hardships, sufferings, and disasters to which northern parties have found themselves exposed, seafaring men, as science has advanced, have looked with deeper and deeper longings toward the mystic circles of the polar regions. There, icebergs are framed and glaciers launched. There the tides have their cradle; the whales, their nursery. There the winds complete their cir-

cuits and the currents of the sea their round in the wonderful system of oceanic circulation. There the Aurora Borealis is lighted up and the trembling needle brought to rest; and there, too, in the mazes of that mystic circle, terrestrial forces of occult power and of vast influence upon the well-being of man are continually at play. Within the Arctic circle is the pole of the winds and the poles of the cold, the pole of the earth and of the magnet. It is a circle of mysteries; and the desire to enter it, to explore its untrodden wastes and secret chambers, and to study its physical aspects, has grown into a longing. Noble daring has made Arctic ice and waters classic ground. It is no feverish excitement nor vain ambition that leads man there. It is a higher feeling, a holier motive, — a desire to look into the works of creation, to comprehend the economy of our planet, and to grow wiser and better by the knowledge.”

Yet higher authorities sustain the value of the explorations, as well as the interest inseparable from them. Those of Professors Bache and Henry only need be cited. Henry, in his Report as Secretary of the Smithsonian for the year 1858, quotes and accords with the judgment of Professor Bache, as expressed before the American Association, when he says that some of the most important contributions to our knowledge of natural history and physical phenomena were made by Doctor Kane, on the second Grinnell Expedition; and this judgment of both the learned professors is expressed in terms as full and unqualified upon the explorations subsequently made by Doctor Hayes.

For these expeditions to the Arctic Ocean, for those of Lieutenant Wilkes in the Antarctic, and indeed for every expedition sent forth under the auspices of the Government, special instructions have been successively laid down by their respective authorities, for the investigation of such questions as the facilities of their journeyings by sea or by land should offer for the advancement of knowledge. The observations of natural phenomena in newly-explored regions, and the collections of typical objects, were to be and have been, continuously and increasingly, matters commanding the labors and time of the numerous corps of scientists selected from the Army and Navy and from civil life.

To furnish a reply to many inquiries on the part of those interested in Arctic explorations, the dates of the publication of the chief volumes narrating these are given in the Appendix.*

* The Table below presents a list of the American Arctic Expeditions which have explored the northeast and northwest coast of America, via Baffin's Bay and Bering Straits.

TABLE.

Year.	Ship.	Commander.	Position Reached.
1850-52	Advance Rescue	Lieut. DeHaven, U. S. N. Lieut. Griffin, U. S. N. . .	{ Beechey Island, lat. 75° 24' N.
1853-55	Advance	Dr. E. K. Kane	By sledges, lat. 80° 56' N.
1855 .	Release Arctic	Lieut. Hartstene, U. S. N. Lieut. Simms, U. S. N. . .	{ Relief of Kane, lat. 78° 32' N.
1855 .	Vincennes	Com. John Rodgers	{ Through Bering Straits, lat. 72° 5' N.
1860 .	George Henry . .	Charles F. Hall	Frobisher Bay, lat. 62° N.
1860 .	The United States,	I. I. Hayes	By sledge, lat. 81° 35' N.
1864-69	Monticello	Charles F. Hall	King William's Land.
1871-73	U. S. S. Polaris . .	Charles F. Hall	By ship, lat. 82° 16' N.
1873 .	U. S. S. Tigress . .	Com. J. A. Greer	Tessiussak, Greenland.
1878 .	Juniata Land Expedition,	Com. D. L. Braine Lieut. Schwatka, U. S. N. .	{ Tessiussak, Greenland. King William's Land.
1879-81	Jeannette	Lieut. De Long	{ North of Bering Straits, crushed June 13, 1881, lat. 77° 14' 57" N., long. 154° 58' 45" E.
1880 .	U. S. S. Corwin (R. steamer)	Capt. C. L. Hooper	{ Relief of the Jeannette, lat. 70° 55' N., long. 173° 50' E.
1881 .	Do. (Second cruise)	Capt. C. L. Hooper	Wrangell Land.
1881 .	U. S. S. Rodgers . .	Lieut. R. M. Berry	{ Relief of Jeannette, lat. 73° 28' N., long. 179° 05' 02" E. (Burned in St. Lawrence Bay, Nov. 30, 1881.)
<i>In the Eastern Hemisphere.</i>			
1881 .	U.S.S. Alliance . .	Capt. G. H. Wadleigh . . .	{ Lat. 80° 10' N., long. 11° 22' E., Relief of Jeannette.

Closing the list of those which have gone out under the Government of the United States, are the Arctic Meteorological Stations for the United States Signal Service ;

Under Lieutenant A. W. Greely, U. S. A., Lady Franklin Bay, lat. 81° 44' N., lon. 64° 30' W ;

Under Lieutenant P. H. Ray, U. S. A., Point Barrow, Alaska, lat. 71° 18' N., lon. 156° 24' W.

These Expeditions had for their primary objects meteorological observations in connection with the other stations of the International Polar Commission.

THE COLLECTIONS OF ILLUSTRATIVE SPECIMENS.

Reference has already been made, in the narrative of the Wilkes Expedition, to the extent and value of the collections brought home by that expedition, and accredited by Professor Henry as the basis of the present extensive National Museum at Washington.

Of the Bering Straits Expedition under Lieutenant (late Admiral) Rodgers, the Smithsonian Report of 1856 says: "The natural history results were of great magnitude, and embraced many new and rare species; the collections made by the naturalists, Stimpson and Wright, being made first under Commander Ringgold in the South Pacific and China Seas and afterward largely increased by those secured around Japan, Kamtchatka, in the Straits, and on the California coast." "The whole of a very rich collection of invertebrates, made in the Arctic Seas," says Professor Henry, "was dredged from the 'Vincennes,' under the immediate superintendence of Captain Rodgers himself, while the Scientific Corps were engaged in another portion of Bering Straits." To these valued additions were also made by the Japan Expedition, under Commodore Perry; by Captain Page, in his exploration and survey of the La Plata and its tributaries; by Lieutenants Herndon and Gibbon, from their work on the Amazon; by Captain Lynch, from the Dead Sea; and by C. F. Hall, from each of the three expeditions that have been narrated in this volume. It would indeed be impossible to accredit here, with any justice, the labors of the very numerous explorations which have been made by our own countrymen within the progressive development of the great West, in the northern section of the continent, outside of the territory of the United States, and in the waters of the oceans and their indentations. The catalogues of the Institution founded at Washington by the noble liberality of the London philanthropist must be consulted; in its Report for 1857 will be found a list of more than fifty of such expeditions, selections from the specimen contributions of which formed a part of the Exhibition in the Government Museum placed at the United States Centennial, Philadelphia, in 1876; but the exhibition, as well as the list now referred to, it is well understood, was but representative of the work accomplished by Army, Navy, and civil scientists.

So far from any forgetfulness, on the part of the explorers or their supporters, of higher results to be hoped for than the extension of geographical discovery, valuable as this itself is, Arctic history incontestably shows a continuous line of expectancy of scientific results in other branches. There has been a general accord with the sentiments of Sir John Barrow, 1818, that if these voyages were to be prosecuted for the sake only of making the passage to China, their utility might fairly be questioned. "But," says Barrow, "when the acquisition of knowledge is the groundwork of all the instructions under which they are sent forth, the commanding officer is directed to cause constant observations to be made for the advancement of every branch of science — astronomy, navigation, hydrography, meteorology, including electricity and magnetism, and to make collections of subjects of natural history — in short, to lose no opportunity of acquiring new and important information and discovery; and when it is considered that these voyages give employment to officers and men, in time of peace, and *produce* officers and men not to be surpassed, perhaps not equalled, in any other branch of the service, the question, *Cui bono?* is readily answered, in the words of Queen Elizabeth's minister, 'Knowledge is power.'"

To this judgment of Barrow, expressed at the revival of Arctic Exploration, may be added that of the late Admiral Sherard Osborn, R.N., confirming what our own Henry, and Bache, and Maury had said.

"Those," said Osborn, "who assert that our labors and researches have merely added so many miles of unprofitable coast line to our charts, had better compare our knowledge of Arctic phenomena to-day with the theories enunciated by men of learning and repute a century ago. They should confront our knowledge of 1874 with that of 1800 upon the natural history, meteorology, climate, and winds of the Arctic regions. They must remember it was there we obtained the clue, still unravelled, to the laws of those mysterious currents which flow through the wastes of the ocean like two mighty rivers — the Gulf Stream and the Ice Stream; must remember that it was there — in Boothia — that the two Rosses first reached the Magnetic Pole, that mysterious point round which revolves the mariner's compass over one

half of the northern hemisphere; and let the world say whether the mass of observations collected by our explorers on all sides of that Magnetic Pole have added nothing to the knowledge of the laws of magnetic declination and dip. They should remember how, a few years ago, it was gravely debated whether man could exist through the rigors and darkness of a Polar winter, and how we only have recently discovered that Providence has peopled that region to the extreme latitude yet reached, and that the animals on which they subsist are there likewise, in winter as well as in summer. All this, and much more, should be borne in mind by those cynics who would have you believe we have toiled in vain; and I hold, with the late Admiral Beechey, 'that every voyage to the north has tended to remove the veil of obscurity which previously hung over the geography and all the phenomena of the Arctic regions. Before those voyages all was darkness and terror, all beyond the North Cape a blank; but, since then, each successive voyage has swept away some gloomy superstition, has brought to light some new phenomenon, and tended to the advancement of human knowledge.' "

METEOROLOGICAL STATIONS IN THE ICE ZONES.

In the prosecution of just such researches the meteorological stations established at the instance of the International Commission of 1881 have been planted in the Arctic and Antaretic Zones. And here it may be well to invoke from all the exercise of a clear and just discrimination between these objects and that less worthy, and at present unfavored object, the problem of the Pole; or, more strictly speaking, between these scientific expeditions, and the voyages having for their chief or sole purpose to reach the 90th degree. For no advocacy of that purpose has the present volume been attempted. Its chief aim has been to make a useful record of what American enterprise has secured toward the elimination of errors in the Polar problem; but more especially for a record of what of scientific value has been secured, and will continue to be secured by further Arctic and Antarctic exploration. In this connection, the labors of the meteo-

rological observers in the ice zones will obtain a special place in history. The first era in this history is at present before us in the work of

THE INTERNATIONAL CONGRESS.

In September, 1875, the late Carl Weyprecht, one of the commanders of the Arctic Expedition, in the ill-fated "Tegethoff," author of its Narrative, and discoverer of Franz Josef Land, first proposed that the nations of the world should unite in one uniform system of simultaneous magnetic and meteorological observations, at as many stations as possible, in both the Arctic and Antarctic regions. The results to be secured in those zones would be comparable with, and utilized in connection with those derived from observations in the temperate zones, and would largely advance the domain of the sciences.

The details of the plan, elaborated in 1879, 1880, and 1881, resulted in the establishment of an Official Polar Commission, all the members of which were clothed with authority by their respective governments. Under their auspices the following stations were recommended to be occupied by observers from the respective countries named.

STATIONS RECOMMENDED BY THE POLAR COMMISSION.

By the *United States*, Lady Franklin Bay, Grinnell Land, N. lat., $81^{\circ} 44'$, W. long., $64^{\circ} 30'$, and Ooglaamie, near Point Barrow, Alaska, N. $71^{\circ} 18'$ lat., long. W. $156^{\circ} 24'$; by *Austro-Hungary*, Jan Mayen, lat. N. $70^{\circ} 58'$, long. $8^{\circ} 35'$, and Pola lat. N. $70^{\circ} 52'$, E. long. $13^{\circ} 51'$; by *Denmark*, Godthaab, lat. $64^{\circ} 10'$, W. long. $51^{\circ} 45'$; by *Finland*, Soudan Kyla, lat. N. $67^{\circ} 24'$, E. long. $26^{\circ} 36'$; by *France*, Cape Horn, lat. S. $56^{\circ} 00'$, W. long. $67^{\circ} 00'$; by *Germany*, South Georgia Island, S. lat. $54^{\circ} 30'$, W. long. $38^{\circ} 00'$, and Kingawa, N. lat. $67^{\circ} 30'$, W. long. $67^{\circ} 30'$. (Hogarth Inlet, Cumberland Sound); by *Great Britain and Canada*, Fort Rae or Fort Simpson, on Great Slave Lake, N. lat. $62^{\circ} 30'$, W. long. $115^{\circ} 40'$, and Toronto, where observations will be made by Canada, N. lat. $43^{\circ} 39'$, W. long. $79^{\circ} 23'$; by *Holland*, Dickson Haven, or Port Dickson, N. lat. $73^{\circ} 30'$, E. long. $82^{\circ} 00'$; by *Italy*, Punta Arenas,

Patagonia, S. lat. $53^{\circ} 10'$, W. long. $70^{\circ} 55'$; by *Russia*, Nova Zembla (Karmakule Bay), N. lat. $72^{\circ} 30'$, E. long. $53^{\circ} 00'$, and Mouth of the Lena, N. lat. $73^{\circ} 00'$, E. long. $124^{\circ} 40'$; by *Sweden*, Spitzbergen, N. lat. $79^{\circ} 53'$, E. long. $16^{\circ} 00'$; by the *Argentine Republic*, steps have been taken to establish a magnetic observatory at Cordoba, S. lat. $31^{\circ} 30'$, W., long. $64^{\circ} 30'$. A number of "Auxiliary Stations" were also proposed.

In addition to the two stations named above for Russia, the Geographical Society of that country proposed to maintain seven special meteorological stations in Siberia. The United States Signal Officer reported in 1882 that the following named countries were co-operating with the United States in the work of Polar research: Germany at Pendulum Island, North Atlantic, and South Georgian Island, in the Antarctic Ocean; England and Canada, Russia, Austria, France, Holland, Finland, Norway and Sweden, and Denmark.

The Bulletin of the Geographical Society of Paris (*Premier Tri-mestre*, 1883), reviews the proposed plan of work, and locates the observers as follows: The United States, at the points before named; England, at Fort Rae, Great Slave Lake, $62^{\circ} 30'$ N.; Germany, on Cumberland Gulf, $66^{\circ} 30'$ N.; Denmark, at Godhavn, Greenland, $64^{\circ} 10'$ N.; Austria, at Jan Mayen, between Norway and Greenland, $70^{\circ} 58'$; Sweden, on Mosoel Bay, Spitzbergen, $79^{\circ} 53'$ N.; Norway, at Bossekop, the north cape of Finmark, $69^{\circ} 56'$ N.; Holland, at Dicksonhaven, the mouth of the Yenesei, $73^{\circ} 20'$ N.; Russia, at Sokandyla, Finland, $67^{\circ} 24'$ N., at Karmakuli Bay, north coast of Nova Zembla, $72^{\circ} 30'$, and at Cape Borchaya, on the east of the Lena Delta, 73° N. For these stations the following moneys have been contributed, chiefly by national appropriations: For the two parties in the United States, \$100,000; for the English, \$33,000; for the Danish, \$40,000; for the Austrians, by Count Wibczek exclusively, \$40,000; for the Swedish, \$16,000; for the Holland observations, \$13,000; for Norway, \$8,000; for Russia, \$90,000; for France, at Cape Horn, \$60,000; for the German observations at the Georgian Islands, \$36,000; for observations by Italy and the Argentine Republic at the South Shetland Islands, \$16,000.

The review of the proposed international work in the Bulletin of the *Société de Géographie* closes with these words: "If we add to all these stations those already existing in Russia, Siberia, Alaska, the English Provinces of the North, etc., it will be seen that around the whole Polar Circle will be a zone of observatories, whose observations will form the study of the globe to the eightieth degree of north latitude; while in the southern hemisphere England has a meteorological observatory in the Falkland Islands. . . . The larger number of the civilized nations are striving by scientific means to wrest the mysterious secrets of the deep from their hidden recesses of the North."

At the date of the issue, by the United States Signal Service, Washington, of the "Memoranda" from which some of these notes of the stations are cited, it is stated by General Hazen, that since the organization of the International Commission, other nations have enlisted in the work, the observing parties have all been dispatched to their respective destinations, and they now are actually engaged in the contemplated observations. The stations will be occupied for at least one, and, in some cases, for three years, and may be divided into two classes, namely: (1.) The special polar stations within thirty degrees of the north or south pole; and, (2.) The auxiliary stations, which are spread over the rest of the habitable globe. Besides these land stations, observations made on shipboard are extensively called for, and it is hoped that enough observations will be accumulated to allow the making of a complete map of the weather, and of the magnetic disturbances throughout the whole globe, for any moment of time during the period in question. In addition to the main work of these international stations, all possible attention will be given to numerous collateral subjects. Thirteen nations have thus far entered heartily into the project; fifteen polar stations, and over forty auxiliary stations have been established.

A distinction was made between the observations considered obligatory and those regarded as desirable. Those considered obligatory in the aid of meteorology are, observations on the temperature of the air and of the sea, barometric pressure, humidity, winds, clouds, rainfalls, and the weather and optical phenomena; those for magnetism are for

absolute declination, inclination, and horizontal intensity; and for variations of the same.

In the Official Report of the Chief of the U. S. Signal Service for the year 1881, he had said that "Owing to the very mobile nature of the atmosphere, the changes taking place on our portion of the globe, especially in the Arctic Zone, quickly affect regions very distant therefrom. The study of the weather in Europe and America cannot be successfully prosecuted without a daily map of the whole northern hemisphere, and the great blank space of the Arctic region upon our simultaneous international chart has long been a subject of regret to meteorologists. . . . The general object is to accomplish by observations made in concert at numerous stations such additions to our knowledge as cannot be acquired by isolated or desultory travelling parties. No special attempt will be made at geographical exploration, and *neither expedition is in any sense an attempt to reach the North Pole*. The single object is to elucidate the phenomena of the weather and the magnetic needle, as they occur in America and Europe, by means of observations taken in the region where the most remarkable disturbances seem to have their origin."

In the expression of these sentiments and in the carrying out, as General Hazen said, the promises of his predecessor, the late General Meyer, by co-operating with the International Committee, he was also furthering the objects in view by the late Professor Henry, as expressed in his letter to Hon. B. A. Willis, dated Jan. 31, 1877, in which he wrote: "I am predisposed to advocate any rational plan for exploration and observation within the Arctic Circle. Much labor has been expended on this subject, especially with a view to reach the Pole; yet many problems connected with physical geography and science in general remain unsolved.

"I. With regard to a better determination of the figure of the earth, pendulum experiments are required in the region in question.

"II. The magnetism of the earth requires, for its better elucidation, a larger number and more continued observations than have yet been made.

"III. To complete our knowledge of the tides of the ocean, a series of observations should be made, at least for a year.

"IV. For completing our knowledge of the winds of the globe, the results of a

larger series of observations than those we now possess are necessary, and also additional observations on temperature.

“V. The whole field of natural history could be enriched by collections in the line of botany, mineralogy, geology, etc., and facts of interest obtained with regard to the influence of extreme cold on animal and vegetable life.

“All of the branches of science above mentioned are indirectly connected with the well-being of man, and tend not only to enlarge his sphere of mental pleasures but to promote the application of science to the arts of life. As to the special plan of establishing a colony of explorers and observers, to be continued for several years, I think favorably.”

The plan referred to by Professor Henry was the one embraced in a Memorial which had been submitted to Congress by H. W. Howgate, then on duty at the U. S. Signal Service Office. The efforts for this *preliminary* Polar Expedition had resulted in the dispatch to Cumberland Sound, by the aid of private subscription only, of

THE SCHOONER “FLORENCE” IN 1877.

The “Florence” was a fore and aft vessel of fifty-six tons, built in Wells, Maine, in 1851, for mackerel fishing; afterwards used by Williams & Haven, Hall’s benefactors, as a sealer in the Southern seas. Although a staunch and fair sea-boat, she was too small for the purpose, and sailed at least two months later than was desirable, leaving New London August 3, 1877. Her three professed objects were, to collect material, dogs, and sledges; secure the help of the Eskimos for a second steamer which it was proposed should follow; accomplish some scientific work, and repay the outlay by whaling.

The “Florence,” under the command of Captain George E. Tyson, the leader of the floe party from the “Polaris,” first anchored in Ni-an-ti-lie harbor, on the western shore of Cumberland Sound, and after securing there a number of Eskimos and materials, anchored, October 7, in An-naw-nac-took, in about lat. 67° N., long. $68^{\circ} 40'$ W. A small observatory and working-place was erected under shelter for meteorological and other observations, and as soon as the snow became compact

a snow-house built over this tent, which remained as a lining. Scientific work was begun at once in the interests of meteorology and the collection of specimens in natural history. The co-laborers were Mr. Ludwig Kümlien and Mr. O. T. Sherman, who report that from their peculiar surroundings and isolation they "lost much of their wonted enthusiasm during the long dreary winter, and found rest only in continued work. Their disappointments were increased by the stormy and backward spring of 1878, the treacherous condition of the ice, and the departure of the 'Florence' from the harbor as early as the 13th of July. In her hasty leaving, valuable preparations were of necessity abandoned."

The collection of material for a future Arctic colony had been successful. Sixteen Eskimos, among them "a nephew of Joe, of 'Polaris' fame," twenty-eight dogs, and enough of Arctic clothing, etc., were on deck and in the hold.

But on the return of the "Florence" to Godhavn, July 31, no Expedition steamer was to be seen, nor a word of news of such, or of letters from home; after three weeks of waiting, therefore, profitably again employed in scientific labors, the "Florence" returned to Cumberland Sound, and re-landed the Eskimos and their effects. September 12 she headed for home, reaching St. Johns, Newfoundland, on the 26th, from which port, after encountering a storm of unusual fury, Captain Tyson's skill brought her safely into Boston, October 30, 1877.

The value of this Expedition will thus readily appear to consist in the labors of the scientific officers who have been named. The "Bulletins of the United States National Museum" furnish the catalogues of the specimens in natural history, now on deposit in that Institution. Bulletin No. 15 (Department of the Interior) is prefaced by a brief Introduction from Mr. Kümlien, from which, and from "The Cruise of the 'Florence' by Howgate," the preceding notes have been drawn, and by a very interesting Ethnological Report.

Professional Paper No. XI. of the Signal Service, is a quarto Report by Mr. O. T. Sherman, the meteorologist of the Expedition. Following a brief introductory note of the cruise, Mr. Sherman in this volume gives us the meteorological and physical observations made at "Ananito,"

“American,” and “Niantlic” harbors on Cumberland Gulf: the first trustworthy observations on those shores, which had long needed a careful survey and tidal observations for the benefit of the frequent visits of whalers there.

THE UNITED STATES SIGNAL SERVICE STATION AT LADY FRANK-
LIN BAY.

Under the painful anxieties which to-day invest one of the United States Signal Service Stations, and in connection with the return of the party which had located at the other station, Point Barrow, notes of their history are instructive.

The colony at Fort Conger, in Lady Franklin Bay, lat. $81^{\circ} 44' N.$, long. $64^{\circ} 30' W.$, was established under a Special Act of Congress, appropriating the sum of \$25,000 for this purpose. By direction of the Secretary of War, First Lieutenant A. W. Greely, U. S. A., in June, 1881, was charged with the duty of establishing a *permanent* station at the most suitable point north of the eighty-first parallel, and contiguous to the coal seam discovered near Lady Franklin Bay by the English Expedition of 1875. The coal vein was expected to afford sufficient fuel.

It was the intention of Congress that this station should be maintained for three years at least, for according to the Report of Hon. Mr. Whitthorne from the Committee of Naval Affairs, House of Representatives, recommending the appropriation, an annual visit should be made to the Station to carry fresh food and supplies, and, if necessary, to bring back invalid members of the Expedition and carry out fresh observers to take their places.

The party under Lieutenant Greely consists of Lieutenants F. F. Kislbury and James B. Lockwood, and Dr. O. Pavy, Acting-Assistant Surgeon and Naturalist, with a force of sergeants, corporals, and privates of the United States Army, numbering eighteen. The Lieutenant received his instructions from the Chief Signal Officer, who embodied in them specific directions for the different branches of the work to be accomplished, supplemented by special instructions from “The Coast and Geodetic Survey,” with a translation of those adopted by the

International Polar Conference of 1879, and a copy of those furnished by the National Academy of Sciences to the Secretary of the Navy for the North Polar Expedition of 1871 under Captain C. F. Hall.

The directions for the outward voyage, and the general work of the party after reaching their station, required that after leaving St. Johns, Newfoundland, "except to obtain Eskimo hunters, dogs, clothing, etc., at Disco or Upernavik, only such stops will be made as the condition of the ice necessitates, or as are essential in order to determine the exact location and condition of the stores cached on the east coast of Grinnell Land by the English Expedition of 1875. During any enforced delays along the coast it would be well to supplement the English depots by such small caches from the steamer's stores of provisions as would be valuable to a party retreating southward by boats from Robeson's Channel. At each point where an old depot is examined, or a new one established, three brief notices will be left of the visit—one to be deposited in the cairn built or found standing, one to be placed on the north side of it, and one to be buried twenty feet north (magnetic) of the cairn. Notices discovered in cairns will be brought away, replacing them, however, by copies."

The steamer "Proteus," on her arrival at Lady Franklin Bay, was to discharge her cargo with the utmost dispatch, and return to St. Johns, bringing a report of the proceedings and observations made during the voyage, while the party which landed, after erecting a dwelling-house and observatories, were to make, in accordance with the proposals made to the Navy Department, sledging expeditions for geographical surveys to the high land north of Cape Joseph Henry; their chief work, however, was to be that of the scientific observations which have been named.

GREELY'S VOYAGE TO LADY FRANKLIN BAY.

[From an Unpublished Letter loaned by the United States Signal Service.]

Leaving St. Johns, Newfoundland, July 7, Lieutenant Greely reached Godhavn on the 16th, the voyage being made in face of continuously adverse winds, two strong northerly gales and constant cloudy and foggy weather. The ship behaved admirably. The only ice seen south of Cape

Farewell was a few icebergs off Funk Island, and about forty in 52° N. and $53^{\circ} 15'$ W. Pack-ice was fallen in with at 10.30 P. M. July 12, in lat. $61^{\circ} 30'$ N., $53^{\circ} 30'$ W., and a second pack encountered the same day, at 2.30 P. M., in $62^{\circ} 30'$ N., $52^{\circ} 15'$ W., was passed through in an hour; neither offered any obstructions to free passage or caused the slightest delay. They both consisted of ice-floes varying from one to eight feet above the water. Coming from the east coast of Greenland, they had drifted with the southerly current from Cape Farewell into Davis Strait.

From Herr Krarup Smith, Inspector of North Greenland, it was learned that the past winter in Greenland, except a brief period of cold in March, had been one of marked and unusual mildness, and that the ice north of Upernavik had broken up very early. July 20, Dr. Octave Pavy joined the Expedition as Acting Assistant Surgeon. Twelve dogs, a large quantity of dog food, and some sealskins were procured, with a considerable quantity of "*mattak*," skin of the white whale, a very valuable anti-scorbutic; and a few articles of fur clothing obtained by barter, as they could not be bought for money. Hard bread and tobacco were principally given in exchange.

The remains of the house purchased by the "Florence" in 1880 were taken on board, as well as thirty thousand pounds of buffalo pemmican stored by the same Expedition. A good set of observations for time were made July 19-20, at the only hours during which the sun shone.

Leaving Godhavn the morning of the 21st, the vessel reached Rittenbenk the same forenoon. At that point were purchased a number of sealskins, a large quantity of dog food, and other minor articles, which had been accumulated for the Expedition through the energy of Dr. Pavy. Being delayed by the fog Lieutenant Lockwood was sent with a party to obtain birds from Awe-Prins Island. He returned that evening with sixty-five guillemots (*Alcaawa* or *Alca Bruennichi*). It was said at Rittenbenk that the spring had been the most forward one for years.

From Rittenbenk, running through the Waigat, the steamer was off Upernavik 9 P. M. July 23, but owing to the fog could not enter the harbor until next morning. Two Eskimos who were expected to accompany

the Expedition were not available, and in consequence a trip to Präven, about fifty miles distant, was necessary to obtain others. Skin clothing could not be obtained, except ten suits, which having been made by order of the Danish Government for the use of the International Polar Station of Upernavik of 1882-83, were now sold through the kindness of Inspector Smith.

On the morning of July 25 Lieutenant Lockwood left in the steam-launch "Lady Greely" for Proven, taking a circuitous route inside the islands, rendered necessary by bad weather. He returned early on the 28th, bringing for service with the Expedition a native, Jans Edward, and a half-breed, Frederick Shorley Christiansen; he also procured about a dozen suits of skin clothing, which, though second-hand, were very serviceable. He had killed one hundred and twenty guillemots during his voyage. The launch behaved admirably, both as a sea-boat and under steam.

Lieutenant Kislingbury, under orders, made two visits, July 24 and 25, to the "Loomery" near Sanderson's Hope, bringing back the first day three hundred fine birds, and on the latter one hundred and fifteen, all guillemots (*Alca Awa*), and ten dogs, five of whom died of dog disease, and must have been sick when sold. Additional dog food, sledge-fittings, dog harness, and sealskins were also bought. It was through the marked interest and kindly influence of Inspector Smith that the Expedition secured the services of the natives and obtained so fair a stock of needed articles.

The Meteorological Records of the past winter showed it to have been very mild, and the spring very early. Inspector Smith remarked that in fourteen years Upernavik had never been so green. Reports from Tessi-ussak were to the effect that the ice, breaking up very early, was all gone. On the afternoon of July 29 the anchorage of Upernavik was left, and at 7 P. M., having run out the southern way, the vessel was distant three miles, just off the island to the west. Running northward a few hours, the Middle Passage was taken, and at 7 A. M. July 31, the engines were stopped, as the dead reckoning placed the vessel only six miles south of Cape York; a dense fog prevented the land from being seen, but an hour later, the fog lifting a few minutes, showed land about

five miles distant. This experience of the "Middle Passage" may be fairly said to have been *without parallel or precedent*. The run of the English Expedition of 1875-76 from Upernavik to seventy-five miles south of Cape York in seventy hours was said to have been unprecedented; this passage by the same route, and to within five miles of Cape York, was made in thirty-six hours, *half the time* taken by the Expedition under Sir George Nares to run a less distance.

Nothing in the shape of a pack was encountered in Baffin's Bay; but in about 75° 08' N., 63° 40' W., a pack was seen to the westward; whether open or compact was uncertain. At 8.15 A.M. July 31, the fog lifting, disclosed Petowik glacier near, to the north of which, in small patches of dirty reddish color, was seen the red snow among the "crimson cliffs" of Sir John Ross. Sighting the Carey islands at 3.10 P.M., two parties were landed on the southeast at 5.45 P.M. The party under Dr. Pavy obtained from the cairn on the summit the record left by Captain Allen Young in 1875 and 1876, and with Lieutenants Greely and Lockwood found and examined the whaleboat and depot of provisions left by Sir George Nares in 1875; they were in good and serviceable condition.

August 2 Littleton Island was reached. Here a personal and exhaustive search of seven hours was necessary to find the English mails, which, in four boxes and three kegs, have been forwarded in order that they may be returned to England. There was a very small cairn near the mails, but with no record. A record enclosure was left here, and Lieutenant Lockwood with a party landed about six and a half tons of coal, as a depot of fuel for possible future use. It is in and around a large cask, on low ground, on the southeast side of the island, facing Cape Alexander. Lieutenant Kislingbury and Dr. Pavy visited Lifeboat Cave to communicate with the Etah Eskimos and see the "Polaris" winter quarters. Several photographs of the surroundings were taken by Sergeant Rice, and a number of relics were brought off, which will be forwarded. The Transit instrument of the "Polaris" (not seen by the English Expedition of 1875) was found about twenty feet from the cairn. The Etah Eskimos have evidently quitted the place, as all traces were old, a year certainly, and probably two or three years.

In searching on Littleton Island for the Nares cairn about fifty small cairns (many evidently for game) were found, in two of which were records from the steamship "Erik," Captain Walker, June 20, 1876. A cairn carefully built, and with an aperture at the base, probably that of Sir George Nares, was found open and empty. A record was made by Lieutenant Lockwood for deposit, but a message sent him when the English mail was found caused him to withdraw it, or he was erroneously informed that the cairn sought for had been discovered. It probably has been plundered, as a piece of a London newspaper, "The Standard," was found in the snow on the west side of the island. It contains a notice of a lecture by Sir George Nares in 1875.

Some repairs to the wheel of the ship caused several hours' delay; but Littleton Island was left at 10.45 P.M. The weather being very fair, and no ice visible, the captain was directed to run direct for Cape Hawks. August 3, Cape Sabine was passed at 1.50 A.M. and Cape Camperdown at 4.10 A.M. At 8.30 A.M. the "Proteus" was off Cape Hawks, and at 9.10 A.M. lay to about two miles north of it, between the main land and Washington Irving Island. Lieutenants Greely and Kislingbury proceeded to the main shore, and examined the English depot of 1875. The jollyboat was found in good condition, and, being short of boats, was taken. Several photographs of the surroundings were taken by Sergeant Rice. Washington Land was first sighted at 3.55 P.M. through openings in the fog which commenced setting in. About 5 P.M. the 80th parallel was crossed, and at 5.30 the ship was abreast off Cape Collinson, where two hundred and forty rations are cached, but which were not visited, through fear that denser fogs would set in and seriously delay the northward passage. At 10 P.M., after running slowly through a dense fog, it was necessary to stop until the next day (August 4), when the fog cleared at 11.15 A.M. Franklin Sound was sighted about eight miles northeast (true); it was passed at 11.45 A.M. At 2 P.M. the ship stopped in the northeast end of Carl Ritter Bay, where about two hundred and twenty-five bread and meat rations were landed by a party, for use in case of a retreat *south* in 1883. The depot was made on the first bench from the sea, just north of a little creek in the extreme northeast part of the bay.

About 7.45 P. M., off Cape Lieber, a heavy pack against the land was passed by a detour to the eastward, and at 9 P. M., August 4, the vessel was stopped for the *first time by ice*, in the extreme southeast part of Lady Franklin Bay, only eight miles from destination. The pack was a very heavy one, and running from Cape Baird northward in a semicircle, reached the Greenland coast, where it touched the land just south of Offley Island, near the mouth of Peterman's Fiord. It consisted of thick Polar ice, ranging from twenty to fifty feet in thickness, cemented together by harbor ice from two to five feet thick. It was impossible to do aught but wait. The vessel was tied to the pack off Cape Baird, and awaited a gale.

August 5, Greely went ashore at Cape Lieber, with Lieutenant Lockwood, Doctor Pavy and a party, to examine the ice from the cliffs. Lieutenant Lockwood erected a cairn on the highest peak. No other cairn could be seen on it or from it, nor on other peaks visited by Greely and Doctor Pavy. Occasional lanes of water could be seen through the rifts of the fog-cloud which covered Hall-basin; but the main pack was firm and unchanged. August 6, the pack moving slightly, obliged the vessel to change her mooring-place from time to time; it drove the ship out of Lady Franklin Bay, and during two days she was gradually driven south; probably twenty-five miles of ice in huge fields passed southward. Every opportunity was improved to steam around such fields, to keep head against the southerly current; but by the evening of August 8 the steady north wind had forced the whole pack down, while the fields previously driven southward, packed fast together, formed a huge, compact barrier, stretching from Carl Ritter Bay across to Hans Island. Only a mile or so of open water remained. A *nip* appeared most probable, and preparations were hastily made to unship screw and rudder. During the night matters improved somewhat; but again, during the 9th and 10th, the ship was forced slowly southwards to within about five miles of Hans Islands, having lost about forty-five miles of latitude.

RELEASE OF THE "PROTEUS."

About noon of the 10th the long-desired southwest gale set in, accompanied by snow, starting the pack northward. The snow cleared the next morning, but the gale fortunately continued, and open water was visible on the west coast as far northward as could be seen. At 7.30 A.M. the ship rapidly ran northward, and about 1 P.M. again passed Cape Lieber, and at 2.40 P.M. had crossed Lady Franklin Bay. Either ice-foot or pack-ice jammed against the shore, covered Watercourse Bay, but a narrow lane permitted the vessel to enter Discovery Harbor just inside Dutch Island, where harbor ice about eighteen inches thick was found, covering the whole harbor as well as the western half of Lady Franklin Bay. The vessel forced her way about one fourth of a mile through ice of the character named above, and there stopped, pending a decision as to the locality of the station. Lieutenant Lockwood, sent to examine the bay, reported the place an excellent one for camp, the bay partly clear, but shallow. He thought it probable the vessel could come within about two hundred yards of the shore; the bay, however, was of such shape that while discharging, the vessel would be unprotected against ice, as it is exposed to all winds from northeast to south-southwest. The coal was so located that it could be readily mined after ice formed, and could, if required, be hauled without difficulty to Watercourse Bay or to Discovery Harbor. Lieutenant Greely reluctantly decided to settle at Discovery winter quarters; and it was a fortunate decision, for Watercourse Bay was full of pack-ice.

On the 12th the vessel broke her way through two miles of heavy ice, and anchored off the cairn about one hundred yards from shore; the men were divided into two gangs, to work day and night by four-hour reliefs, until the general cargo was discharged, which was done in sixty hours. Coal was landed, of which there was about one hundred and forty tons, enough to last two winters without mining any. Work on the house progressed rapidly, though but three or four men could be spared for the work. The foundation was finished, floor stringers laid, and about one eighth of the frame set up. Fourteen musk oxen

were immediately killed, and enough meat procured for issue, three times a week, for the following seven months, besides ten days' rations of dried birds. "The post has been named Fort Conger, in honor of Senator Conger of Michigan. Photographic views have been, and will be, taken once each day. From these one can best judge of the progress and condition of affairs."

It is proper to state, says Lieutenant Greely, that a retreat from here southward to Cape Sabine, in case no vessel reaches here in 1882-83, *will be safe and practicable*; although all but the most important records will necessarily have to be abandoned; abstracts could and will be made of those left.

In the Reports of the Signal Officer for 1881-82, it is stated that, "The station has *supplies* for *two* years; that it was contemplated to be visited in 1882 and 1883 by a seal steamer or other vessel, bearing such supplies and additions to the party as might be deemed needful; and that in case such vessel is unable to reach Lady Franklin Bay in 1882, she will cache a portion of her supplies and all of her letters and dispatches at the most northerly point she attains on the *east coast of Grinnell Land*, and establish a small depot of supplies at *Littleton Island*. Notices of the locality of such depots will be left at one or all of the following places, viz.: Cape Hawks, Cape Sabine, and Cape Isabella. In case no vessel reaches the permanent station in 1882, the vessel sent in 1883 will remain in Smith's Sound until there is danger of its closing by ice, and, *on leaving will land all her supplies and a party at Littleton Island*, which party will be prepared for a winter's stay, and will be instructed to send sledge parties up *the east side of Grinnell Land* to meet this party. If not visited in 1882, Lieutenant Greely will abandon his station not later than September 1, 1883, and will retreat southward by boat, following closely the *east coast of Grinnell Land*, until the relieving vessel is met or Littleton Island is reached."

THE ATTEMPTED RELIEFS OF 1882 AND 1883.

"During the first session of the Forty-seventh Congress an Act was passed June 27, 1882, appropriating \$33,000 for the supply and relief

of Lieutenant Greely's party; and under this appropriation Mr. William M. Beebe was sent out with men and supplies on board the 'Neptune,' on the 8th of July following. His Report to the Signal Officer, dated St. Johns, N. F., September 28, tells the brief story of the failure of this vessel to reach the station.

"The 'Neptune' met the first field ice July 13, lat. 60° N., long. 54° W. Mr. Beebe says that these fields, though not large, were very heavy and solid, and this was undoubtedly the heavy winter ice, borne from the eastern coast of Greenland by the strong current which sets southward from about Iceland, turns to the westward and northward around Cape Farewell, and flows up the western coast of Greenland, until, in lat. (about) 67° N., it meets and mingles with the current from Baffin's Bay. These united currents set southward with great strength down the coast of Labrador, and trending eastward, pass around and down the eastern coast of Newfoundland and into the Gulf Stream, carrying with them the immense icebergs launched from the numerous glaciers of West Greenland and so much of the ice-fields as had survived the passage from Davis Strait." The passage of the ship did not exceed three miles an hour, but she broke through the fragments of solid ice-pans, clearing the floe within two days, and arriving at Godhavn on the 17th. Here she learned the death of the Danish Inspector Smith, so frequently referred to in all previous American expeditions. Leaving Godhavn July 20, the "Neptune" encountered a blinding snowstorm, rendering it impossible to pick her way through the channels. She tied up to the ice-fields for the night. Working again with difficulty from the 23d to the 28th, after helplessly drifting with the tides in plain view of Cape York and the Crimson Cliffs of Beverly, she passed Littleton Island; but, a half hour later, was checked by an unbroken ice-barrier, from twelve to twenty feet thick, extending from Cape Inglefield on the West, across the sound, to Ross Bay and to the northern horizon. Turning again southward, and looking in only at Life-boat Cove and Port Foulke, she made a tolerably comfortable anchorage in Pandora Harbor, finding here Sir Allen Young's record of his visit in the "Pandora," 1875; and, for a most acceptable change from the ordinary ship's fare, abundance of game —

Arctic hares, eider ducks, auks, and a variety of gulls. August 7, the field ice having been thoroughly broken by the southwest gales, the "Neptune" again turned northward, reaching on the 10th lat. $79^{\circ} 20'$, twelve miles from Cape Hawks and seventeen from Cape Prescott. On the 18th she anchored in Payer Harbor, lat. $78^{\circ} 42' N.$, long. $74^{\circ} 21'$, finding on Brevoort Island, and on an islet near it, Captain Nares' record and the depot established by Captain Stephenson. The broken cache was rebuilt, and a record of the "Neptune" placed in it.

Making a third northward effort on the 23d, but checked in it, Captain Sopp found the condition of the ice and the prevalence of the southwest winds to demand that the ship should seek a harbor; he returned to Pandora Bay, and from thence, after several unsuccessful attempts even to establish a depot as far north as Cape Hawks, anchored off Littleton Island on the 28th. Mr. Beebe here effected a landing, and established one cache on Cape Sabine and a second on Littleton Island, securing these so as to be invisible from any point a few yards distant, that they might be safe from the Etah Eskimos, a party of whom had already twice visited the "Neptune." Minute directions for finding these stores, as well as a whaleboat placed on Cape Isabella, were left on another part of the Island, as had been requested by Lieutenant Greely's letter of the previous year. Mr. Beebe was satisfied that if Lieutenant Greely should come down to Cape Sabine he would readily find these. After effecting this provision for the future of that party, he was, however, reluctantly compelled to assent to the decision of the captain of the "Neptune," its first officer, Mr. Norman, and the surgeon, to return to the United States. Further delay was useless and extremely hazardous, and the safety of the ship and the lives of all on board demanded an immediate departure. On the 8th of September Godhavn was again reached, and the dogs, dog-food and lumber put on shore for a subsequent expedition: on the 24th the "Neptune" anchored again at St. Johns. The voyage was another and a striking illustration of the uncertainty of ice-navigation, especially as contrasted with that of the "Proteus" when she took out the party under Lieutenant Greely the previous year. It was disheartening to the friends of Arctic Exploration, as well as to the

relatives of the explorers, that no supplies could be afforded to those at such distance from home, and no reports of their labors or of their condition could be received. Nothing whatever could be done until the summer of 1883.

THE RELIEF SHIP "PROTEUS," 1883.

In obedience to orders from the War Department and from the chief signal officer U. S. A., Lieutenant E. A. Garlington left New York on board the U. S. steamer "Yantic," Commander Wildes, June 12, and, on arriving at St. Johns on the 21st, finding there the steamship "Proteus," which had been chartered for an expedition to relieve Lieutenant Greely's party, nearly ready for sea. After a consultation with Commander Wildes, the steamships "Yantic" and "Proteus" left St. Johns June 29, Lieutenant Garlington having been joined on board the "Proteus" by Lieutenant J. C. Colwell, U. S. N., on duty, under orders from the Navy Department, as a volunteer.

Disco Island was sighted July 6, but Captain Pike, "by some error in his bearings," ran by the entrance to the harbor, and was making about due course for Rittenbenk, when some one on deck discovered a pilot-boat steaming after them. The ship was put about and the captain piloted into Godhaven.

The "Yantic" arrived on the 12th, having come all the way under sail and encountering no ice. Commander Wildes informing the lieutenant that he would remain at Godhavn probably a week, and then go to the Waigat Strait to procure coal, Garlington left the harbor on the 16th, determined to push his way forward without further delay. The Inspector and the Governor of Godhavn both assured him that there would probably be no difficulty in reaching the station. On the 17th, when passing Hare Island, icebergs were numerous in every direction. On the 18th the "Proteus" was forcing her way through ice varying from two to six feet in thickness, and on the second day following she was stopped by an impenetrable pack. Lieutenant Colwell determined the longitude, by an artificial horizon placed on the floe, to be $61^{\circ} 30'$, "proving the captain of the ship to be entirely in error as to his position: Captain Pike had no idea of what was the

local deviation of the compass." The "Proteus" again turned south, Cape York in sight; on the 22d the southeast Carey Island, the cache of Nares' Expedition, was visited, and a record taken up which was made there Aug. 1, 1881.

The record is as follows:

"International Polar Expedition to Lady Franklin Bay, fitted out by the War Department, under the supervision of General W. B. Hazen, Chief Signal Officer U. S. Army, and commanded by First Lieutenant A. W. Greely Fifth Cavalry, A. S. O. and Asst.

"Left in the Steamship 'Proteus,' island of Upernavik, 7 P. M., July 29, 1881, and at 7 A. M., July 31, stopped by a heavy fog about six miles south of land supposed to be Cape York. Middle passage taken and found to be *entirely unobstructed* by ice. All well. This notice deposited August 1, 1881.

(Signed)

"J. B. LOCKWOOD,

"Lieut. 23d Inf. U. S. Army, Third Officer."

(MEMORANDA.)

"One keg of biscuits opened and found mouldy. One can of beef opened and found good. Stores generally found apparently in same condition as when deposited here in 1875.

(Signed)

"J. B. LOCKWOOD, Lieut. U. S. Army."

At Cape Sabine, Payer Harbor, the cache of stores made by the party from the "Neptune" the year previous, was found to be in fair condition.

THE "PROTEUS" CRUSHED.

Under the ever quickly changing, but now favorable condition of the leads in the ice, Lieutenant Garlington determined to go out in the harbor, to examine these and endeavor once more to go North. By his glass he saw that "the pack had broken and open lanes of water had formed, leading across Buchanan Strait along Bache Island and across Princess Marie Bay. At 8 P. M. the 'Proteus' rounded Cape Sabine and proceeded through the open leads in the broken ice to within four miles of Cape Albert, where the ship was stopped about six hundred yards from the open water, and Captain Pike's efforts to force a passage by ramming entirely failed."

The fatal issue now came. The "Proteus" on arriving next day again within four miles of Cape Albert, discovered that the open lane was now filled with a solid pack; she turned southward in a fruitless attempt to make her way out; at 2.45, movement in any direction was impossible. Ice from five to seven feet in thickness came against her sides and then piled itself up on the floe amidships and astern; at 4.30 P.M., the starboard rail gave way, the ice forced its way through the ship's side into the bunker, the deck planks rose, the seams opened out; at 7.15 she slowly passed out of sight on an even keel. Alive from the outset to the coming crush of the nip, Lieutenants Garlington and Colwell and Dr. Harrison had succeeded in saving one of the boats and a quantity of the stores; the Report to the Signal Officer affirms that with the exception of the Chief Engineer of the "Proteus" and the Boatswain, none of the crew of the "Proteus" lent assistance to this work, but employed themselves in opening and rifling the boxes even of private clothing. With some of the stores saved, Lieutenant Colwell made a cache three miles west of Cape Sabine, which was afterwards increased by the two sidereal chronometers and a quantity of clothing. The cache was intended for Lieutenant Greely's party.

THE BOAT JOURNEY SOUTH.

To render assistance to Greely being now impossible, there remained nothing for the parties from the "Proteus" except the choice either of spending the winter with the Eskimos or attempting to cross Melville Bay in boats. Lieutenant Colwell headed boldly across the bay to establish communication with the "Yantic"; the rest of the party started to coast around the bay and reach Upernavik; after a severe Arctic experience, Colwell reached Upernavik on the 23d, and finding that the "Yantic" was not there, pushed forward to Godhavn where he found the tender, and gladly learned from Commander Wildes that on the 2d of the month at Upernavik, he had received on board all of the other parties from the "Proteus." Lieutenant Colwell's boats had spent in them thirty-eight days, making a voyage of nearly one thousand miles.

September 13, Commander Wildes telegraphed to the Secretary of the Navy from St. Johns, the arrival of the "Yantic," bringing Captain Pike and crew of the "Proteus" and Lieutenant Garlington and the Greely Relief Party. Garlington telegraphed to the Chief Signal Officer the total failure of the Expedition and the crushing of the "Proteus."

The history of this Relief Expedition being at the date of this writing, a subject of investigation before a Court of Inquiry ordered by the President of the United States, it would seem out of place and premature to extend these details. It is, however, eminently proper to refer all who would form a judgment of the voyage of either the "Proteus" or the "Yantic," to the different experiences of the Arctic ships which have attempted this northern passage. They are properly commented upon by Commander Wildes in his letter of Oct. 16, 1883, to Hon. W. E. Chandler, Secretary of the Navy. Those at all familiar with Arctic literature will be slow to condemn either Lieutenant Garlington or Commander Wildes; the first for his conscientious attempt to go forward for the relief of Greely, at a time when the open leads seemed to make such a decision imperative; or the second for not pressing forward his ship well known to be ill-fitted for severe Arctic experiences. Commander Wildes has justly said: "I did not intend to run the vessel under my command in the haphazard, happy-go-lucky fashion which finally brought the 'Proteus' to grief; but to make sure, so far as possible, of every step which I took. I was governed by what I have previously stated in regard to the possibilities of Melville Bay and the probabilities of our being beset in the pack. Once involved in ice, I knew we would be helpless, and our imprisonment of indefinite duration.*"

* The Reports of Mr. Beebe (Signal Service Notes, No. V.) and of Lieutenant Garlington, No. X., together with the Letters from the Hon. Secretaries of the War and Navy, and the Proceedings of the Army Court of Inquiry, in session at this date, will present all the facts in the history of an Expedition located in the best interests of Science, and deprived of relief only by the unfavorable condition of the ice in the northern straits for the two summers, which followed the very opposite conditions which favored the party going out under Greely himself. This fickleness presents nothing new to the readers of Arctic voyages. They will hope that the summer of 1884 will offer free passage to a well-equipped party who will find the long-absent observers under Greely safe, through their endurance of three Arctic winters.

THE STATION NEAR POINT BARROW, ALASKA.

For the establishment of a station in a foreign land an Act of Congress was necessary, but the location of an observing party in Alaska was made under the general power of the Signal Officer to establish stations in the United States.

By direction of the Secretary of War, the Chief Signal Officer intrusted this Expedition to the charge of First Lieutenant P. H. Ray, 8th Infantry, at the date of June 24, 1881, Acting Signal Officer. Lieutenant Ray's party consisted of Acting-Assistant Surgeon G. S. Oldmixon, with three Sergeants and eight subordinates. His orders were to sail as soon as practicable from San Francisco and establish a permanent Station near Point Barrow. Special instructions in regard to the meteorological, magnetic, tidal, pendulum and other observations and for the collection of specimens for the National Museum were placed in the Lieutenant's hands. He was informed that it was designed to visit the permanent Station by steam or sailing vessel in 1882, '83, and '84.

Ray's party sailed from San Francisco in the steamer "Golden Fleece," July 18, 1881.

On the 15th of September he wrote to General Hazen from Ooglaamie, Alaska:—

"SIR, —I have the honor to report that the Expedition arrived at this place on the 8th inst., and after a careful survey found the most suitable place for the Station to be on the northeast side of a small inlet, which I have named Golden Fleece, about eight miles from the extreme northern point of Point Barrow, there being no high land between here and there and all the intermediate country being interspersed with small lakes and lagoons; the only high ground at Point Barrow is occupied by an Indian village. The point adjacent to Point Barrow, where Macguire, R. N. had his observatory, is, I am told, submerged during western gales. On the opposite side of the inlet, about one and a half miles away is the Indian village of Ooglaamie, from which I have named the Observatory. The voyage has been a long one and particularly a trying one upon the party, as a heavy gale was encountered off Cape Lisburne, driving us out of our course to the north and west. And there will still be more or less suffering before I can get quarters up, as the ground is now covered with snow; ice is forming rapidly on the inlet and lakes, and the cargo was landed with extreme difficulty, as it had to be done on an open beach; and for two days through a heavy surf which often half filled our boats in landing, the spray freezing where it struck, and the vessel liable to be driven out to sea at any hour. On the

12th a small wharf was built, and that night fortunately, the wind and sea abated and the balance of the cargo was landed on the 13th and 14th, the natives rendering valuable assistance with their oomiaks. Everything is now on the beach above high tide-mark, nothing damaged or broken of any importance so far as I can find out. It is utterly impossible for me to state now what may have been omitted with the time I have got, as I cannot detain the vessel for fear she may be frozen in before passing Bering Straits; I will only be able to check and correct as I put my stores in the building. I have no changes to recommend as to the members of the party.

"From what Professor Baird said to some members of the party, I find that he expected me to procure specimens of native arms, boats, implements, etc. As these are of value to the natives they will have to be purchased in trade, and as I have not a sufficient supply for that purpose, having only taken enough to purchase fresh meat and to hire boats and labor in landing, I respectfully ask that I may be instructed in the matter.

"In my report from Plover Bay, I mentioned the necessity of the vessel next year sailing from San Francisco at an earlier date than the Expedition this year; the severe experience of the last fifteen days confirms my impressions of that date. Have not seen the sun since I have been here. I give the latitude and longitude by dead reckoning from my own log-book — lat. $71^{\circ} 17' 50''$ N., long. $156^{\circ} 23' 45''$ W."

RELIEF EXPEDITION TO POINT BARROW.

June 24, 1882, Lieutenant J. S. Powell, U. S. A., sailed from San Francisco in the schooner "Leo," one hundred and fifty tons burden, with supplies for the Signal Service Station Ooglaamie. At St. Michael, July 26, Powell shipped as cabin-boy a native named Kan-u-ark, to act as interpreter and messenger. This was effected only after much persuasion. The news of the loss of the "Jeannette" having already reached the people, they seemed loath to venture abroad in the white man's ships. "The simple native of these shores," says Powell, "when he sees the mighty oomiaks of the white man go away in the gloom of the mysterious North, refuses to venture within the reach of the baleful power of the icy North."

On reaching Bering Sea, a heavy gale from the North was experienced with weather too thick to make headway toward the straits. The "Leo" for several days lay without sight of land or sun about four miles from the entrance of Plover Bay; the fog clearing, she was towed up the bay by the U. S. Revenue Cutter "Corwin," Captain J. T. Healy, and again brought out to sea by the same ship.

Passing through a renewal of dense fogs and of a heavy gale, the ship lay at anchor three days at Port Clarence, and thence passed through the strait and crossed the Arctic Circle. On the 14th, Cape Lisburne was sighted under the experience of another heavy gale; but at 12 M. on the 18th, Powell was in a calm, long. $158^{\circ} 50'$ W., lat. $71^{\circ} 21'$ N., and at 8 of the same day, a southeast breeze sprang up which Powell thought would quickly bear the ship to Point Barrow. The next morning he was surprised to find himself considerably to the northeast of it, by the action of a strong northeast current. On landing at the Station August 20, Lieutenant Ray confirmed the observations of this current, adding that had it become calm, the "Leo" might have drifted to the northeast and been crushed by ice; the vessels caught in this current move off to the northeast and not a piece of timber ever returns.

Powell says in his Report (Signal Service Notes, No. X.): —

"The prospect from the station, even in summer, when it is at its best, is monotonous and uninviting, and in winter it must be dreary indeed. The tundra spreads away level and brown, relieved here and there by patches of sickly green, guttered in all directions by shallow water-courses, and covered with small shallow pools, while at no point within view does it reach an elevation of fifty feet above the level of the sea. Vegetation is very scanty, consisting chiefly of moss and lichens and other cryptogamous growths, with occasional patches of hard, wiry grass, and a few simple flowers. The only shrub to be found is the dwarf willow, which, instead of growing in an erect position, creeps along under the moss as if trying to hide from the inclement blasts, and in summer, it shoots forth its pretty rose-colored catkins and green leaves through its mossy covering in a timid and hesitating manner, as if aware of the uncongenial character of its surroundings.

"During eight months of the year the earth is frozen, and during the remaining four it thaws to the depth of a foot from the surface, but below that depth it is permanently frozen to an unknown depth, probably one hundred and fifty to two hundred feet. It is a desolate land, interesting no doubt, but destitute of beauty, one in which the struggle for existence, both by animal and vegetable life, is of the hardest, where the aspects of nature are harsh without grandeur and desolate without being picturesque, and where the dead level of monotony everywhere prevails, the greatest variety being in the length of days and nights, which vary about seventy-two days to about as many minutes.

"The year is divided into seasons, — a winter eight months long and a rather uncertain summer of four months. The latter season, if summer it can be called, is only such by contrast with the preceding winter, for the temperature rarely reaches 60° , and at any time a snow-storm may occur. Snow fell on every day we were at

station. The lowest temperature experienced at the station was 60° below zero. During Lieutenant Powell's stay there was but one day only on which the sun shone sufficiently to make observations."

Of the ice he says:—

"The sea at Point Barrow does not freeze to a greater depth than six or seven feet; the ice with which it is filled comes from a distance, and is generally a mixture of new and old worn ice. There is nothing in this sea approaching an iceberg, but still some very respectable masses are formed, especially near the coast, where the pressure of the moving floes from without is met by the resistance of the land, and huge fields of ice are driven over each other until they become grounded in water from fifteen to twenty fathoms deep and are piled up some forty or fifty feet. No doubt the grandeur and sublimity given to Arctic scenery by the immensity of icebergs are here wanting, but the immensity of power displayed by the chaotic jumble of these enormous ice masses is more calculated to impress the mind than the mere bulk of lofty bergs that stud the seas on the eastern side of the continent. The broken floes are thrown together in every conceivable position, and at every possible inclination of surface, in a profusion of irregularity, of which no language can convey an adequate idea, and which must needs be seen to be appreciated.

"Travelling over such a surface as this is next to impossible, and men without encumbrances could possibly advance eight or ten miles in a day, but if laden with food or otherwise, their progress would be far less than this—heavy ice-sleds would be almost impossible. Wherever there is land there is always an ice-foot—a narrow strip of level ice along the coast, over which sled-travel can be easily carried on, or in narrow channels without currents, when the ice may be comparatively smooth, but in the open sea, at a distance from land, such travel need never be attempted by any means now at our command, for nothing but failure will attend such attempts. The fringe of grounded ice along the Point Barrow coast follows an irregular line, more or less distant from the shore, depending on the depth of the water, and varies from three to five miles in width.

"Beyond the grounded line, the surface of the hummocks and floes is just as rough and uneven as it is everywhere else, but there is always more or less change going on—sometimes slowly and sometimes rapidly. Although to the eye the broad expanse of jumbled ice-hummocks seems as stable as the solid land, the stability is only apparent; a kind of vibratory motion takes place from time to time; the pressure increases and decreases alternately; currents set in, and the whole body of the ice seems to oscillate to and fro, so that it is seldom that the peculiar noises occasioned by the grinding and crushing together of the slowly moving masses cannot be heard. This song of the icy sea is a very peculiar one, and can scarcely be described so as to convey any clear idea of its nature. It is not loud, yet it can be heard to a great distance; it is neither a surge nor a swash, but a kind of slow, crashing, groaning, shrieking sound, in which sharp, silvery tinklings mingle with the low thunderous undertone of a rushing tempest. It impresses one with the idea of nearness and

distance at the same time, and also that of immense forces in conflict. When this confused fantasia is heard from afar, through the stillness of this Arctic zone, the effect is strangely weird and solemn—as if it were the distant hum of an active, living world breaking across the boundaries of silence, solitude and death.”

AURORAS AND THEIR INFLUENCE ON THE MAGNET.

“A description of auroral display, furnished me by members of the party, would lead me to suppose that no known portion of the globe surpasses Point Barrow, and few equal it in the intensity and brilliancy of these displays. The brilliancy of the displays bears no proportion to their number. It was only occasionally that great splendor and magnificence were reached, and the duration of the greatest brilliancy was only brief, compared with that of the display of which it formed a part. Individual auroras often lasted ten or twelve hours or more, but the great bursts of splendor and motion seldom lasted more than thirty minutes, and often did not continue even so long; but while they lasted they were magnificent, indeed. On such occasions the sky became a gorgeous canopy of flames, all splendor, color and motion; arch, column, and banner flashed and faded; silvery rays, with rosy bases and fringed with gold or emerald green, danced and whirled around the zenith, and broad curtains of light flung across the sky in every form of graceful curve and convolution, shook rainbow tints from every fold, until the beholder became bewildered and lost in the dazzling brilliancy.

“In lower latitudes, the aurora is mostly seen as a luminous arch extending across the northern sky. At Point Barrow, the arched form, though common, was not the prevalent one, and the arches that appeared were seldom perfect, or if so, only for a few moments at a time, and the changes of form were so incessant that it was hard to decide which was the prevailing type. The curtain form, mostly broken, but always convoluted and folded on itself like an immense scroll, was a common form, but whatever the form, the phenomena passed over the sky in a succession of waves, sometimes from north to south and vice versa. Intimately connected with the aurora was the disturbance of the magnetic needle—in fact, during the prevalence of the aurora, the magnets were in a state of chronic perturbation, especially during the great displays, when they were often so disturbed that some of them could not be read.”

“Having turned over all supplies to Lieutenant Ray, Sunday, August 27, and relieved from duty under my charge Sergeant Joseph E. Maxfield and Privates Charles Ancor and John A. Guzman, and receiving all mail destined for the United States, preparations were made to leave this dreary region—a region which seems to me to be one in which the bright sunshine of hope enters with a light so subdued that it is but the gleam from a far distant planet penetrating the cavern of ceaseless solitude and woe.

“By reason of the severity of the climate, Sergeant James Cassidy was relieved by Lieutenant Ray from duty at Ooglaamie, and returned with me to San Francisco.

"Anchor was weighed at 2 P. M., Sunday, and our homeward voyage begun in a snow-storm. Heavy drift-ice was moving rapidly to the southwest. This ice was of very peculiar construction and of varied tints, with height from three to thirty feet. Before the gale began, which was previously mentioned as occurring on the 24th, the ice began drifting from the northeast, in a contrary direction to its usual course, and I judged from the movement on Sunday, being identically the same, we would have another gale from the same quarter. My judgment was correct; for, on Monday, the gale commenced in earnest. We passed Point Belcher at 9 A. M., August 28, and Icy Cape at 11 P. M., reached East Cape, Asia, Saturday, September 20, and lay there Sunday and Monday. There is quite a large village located at East Cape, and the natives have a regularly installed chief—the only place we visited where we found a chief. We sailed from East Cape to the Diomedes Islands, reaching there in a gale from the East. Left the Diomedes at twelve midnight, bound for St. Lawrence Bay, and anchored inside the harbor at 3 P. M. next day. This bay is full of historic reminiscences connected with the burning of the U. S. steamer 'Rodgers,' of the Jeannette Relief Expedition. The natives came on board clothed in some of the apparel left them by the officers and crew of this ill-fated vessel. Several had recommendations from the Rodgers party, and in compliance with requests made therein, each one was supplied with tobacco, bread and molasses. One of the natives described to me the accident which befell Master Putnam of the Navy, and stated that some time after the ice-floe, bearing Putnam, drifted out to sea, a southeasterly wind brought the floe back to shore, and he saw the remains of Putnam on it, his face and hands much discolored and the body swollen. The ice did not remain long, but floated out again, moving toward the Arctic.

"We left St. Lawrence Bay on September 8, and reached Plover Bay on 11th, at 2 P. M. Owing to cloudiness, I failed to get an observation of the sun on that day. On Tuesday the 9th, I left the vessel for shore at 7.30 A. M., but had to wait an hour for the fog to rise. Succeeded in getting two sights, but had to suspend operations, as the rain began to fall. It cleared up sufficiently by the afternoon to secure six sights through the clouds—three upper and three lower limb.

We sailed from Plover Bay September 13, for Fort St. Michael's, to return the native, Kan-u-ark, who shipped with us at that place. Shortly after leaving Plover Bay a gale sprang up, which compelled us to alter our course and run to the south of St. Lawrence Island. At 5 P. M. of the 14th, the ship struck a reef of hidden rocks, not marked on chart, about six miles south of the island. For a while it looked as if we would winter in this region, or else go to the bottom. The heavy sea favored the vessel in getting off. The pumps were manned, and, to our satisfaction, we found but little water making. Made St. Michael's September 17. While at this place I made informal inspection of the Signal Office. Left St. Michael's on the 20th, and touched at Golovin Bay same date. On the 28th of September, in Bering Sea, the barometer commenced falling rapidly, and a fierce gale sprang up from the East, which soon blew with so much violence that we were obliged to take in all our canvas and heave to under a double-reefed mainsail and foresail. We expected by the next day that it would have blown itself out and the worst be over,

but it only increased in fury, and for the next day, and the next, and for full five, we were tossed to and fro, at the mercy of such a storm as I hope I shall never again experience. By the time the storm was over, the entire party were worn out, and the patience exhibited under such circumstances certainly became a virtue. We passed through Unimak Pass on the 5th of October. Our voyage from thence across the Pacific to San Francisco was, on the whole, favorable, and we reached the latter place October 2."

RAY'S RETURN.

Lieutenant Ray's party were unfortunately recalled by a positive enactment of Congress at its Session of 1882-83. They arrived at Washington in October 1883.

The full Report of the work executed at Ooglaamie is being prepared by the Lieutenant, while these sheets are passing through the press; his reductions of the observations made and arrangement of other material will probably require a period of some months, and will be published by the Chief Signal Officer. They will be looked for with much interest.

INCIDENTAL BENEFITS OF EXPLORATION.

A most important gain resulting from Arctic exploration is the extension of geographical knowledge by the discoveries which have added a large surface to our maps and charts. They have done more. The discoveries have increased the domain of civilization and commerce, bringing under English rule a new and large section of the American Continent, and opening up the acquisition of Alaska by the United States. To cite the language of Hon. Judge Daly, President of the American Geographical Society:—

"Explorations for the discovery of the Northwest Passage, and those sent out for the relief of Sir John Franklin or other absent explorers, resulted in the discovery of that great region lying within the Arctic Circle between 60° and 130° west longitude up to Cape Parry 71° 23' west longitude, and 77° 6' north latitude; or, from Davis Strait to Cape Bathurst; embracing Banks, Prince Albert, and Prince Patrick's Lands, Melville Island and Sound, McClintock's Channel, Bathurst Island, Victoria, Prince of Wales, and King William Land, Boothia, and Gulf of Boothia, North Somerset, North Devon, Melville Peninsula, Cockburn Island, Grinnell, Ellesmere, and Washington Lands, Lancaster, Eclipse, and Jones' Sounds, Wellington Channel, Kellett, Barrow

Straits, Franklin Straits, Peel, Sir James Ross, and the Fury and Hecla Straits, Regent's Inlet, and the discovery in 1833, by Sir James Ross, of the North Magnetic Pole.'"

To these discoveries in the West are to be added the lands outlying the Siberian Coasts, now, for the first time in the world's history, circumnavigated. The Circumpolar Map to be found in the pocket of the volume shows the chief localities visited and the names of the explorers, the latest American visits being noticed.

At a meeting of the Royal Geographical Society, in 1865, Captain Sherard Osborn said:—

"In the year 1818 Baffin's discoveries on the one hand and those of Bering upon the other, with dots for the mouths of the Mackenzie and Hearn Rivers, were all we knew of the strange labyrinth of lands and waters now accurately delineated upon our charts of the Arctic Zone. Sailors and travellers in thirty-six years have accomplished all this; not always, be it remembered, in well-stored ships, sailing rapidly from point to point, but for the most part by patient toiling on foot, or coasting in open boats round every bay and fiord. Sir Leopold McClintock tells the Royal Dublin Society that he estimates the foot explorations accomplished in the search for Franklin alone at about forty thousand miles. Yet during those thirty-six years of glorious enterprise by ship, by boat, and by sledge, England only fairly lost one expedition and one hundred and twenty-eight souls out of forty-two successive expeditions, and has never lost a sledge party out of about one hundred that have toiled within the Arctic Circle. Show me upon the globe an equal amount of geographical discovery, or in history as arduous achievement, with a smaller amount of human sacrifice, and then I will concede that Arctic Exploration has entailed more than its due amount of suffering."

At one of the meetings of the American Geographical Society of New York, Mr. Henry Grinnell replied to questions of like character by stating some of the results in the extension of commerce and trade:—

- "1. Sir H. Gilbert's discovery of the cod fisheries of Newfoundland.
- "2. From Davis' discoveries the great whale fisheries of the West.
- "3. From the discoveries of Hudson (who also discovered and sailed into our North River, which now bears his name, while on an Arctic voyage,), Hudson's Bay, and the operations of the great fur companies.
- "4. Sir John Ross; the whale fishery of the North and northwest of Baffin's Bay.
- "5. Captain Parry; whale fishery of Lancaster Sound, Barrow Strait, and Prince Regent's Inlet.

"6. Admiral Beechey; whale fishery of Bering Straits, in which, in the space of two years, the whalers of Nantucket and New Bedford obtained cargoes from which it is said they have realized eight millions of dollars."

In addition to the last of these statements from Mr. Grinnell, in which he refers to the discoveries by Admiral Beechey, R. N., must be taken into account the later and still more profitable explorations made by the officers of the American Navy and Merchant Marine. By these explorations the safety and success of the whaling fleets have been very materially forwarded.

"Far beyond the profits of the whale fisheries also is to be placed the daily increasing value of the trade in the fur-seal and seal-otter skins to the merchant companies, and the revenue derived from these to the U. S. Government. Ten years ago, the gross value of the fur trade of Alaska exceeded one million dollars. The revenue of the U. S. Government from the seal-islands alone was \$300,000 per annum. For the last ten years respectively, the revenue per annum as stated on the books of the Treasury Department has been the following:—

TABLE OF REVENUE FROM THE ALASKA FISHERIES.

Year.	Tax on Sealskins.	Rent.	Total.
1873	\$252,181.12	\$55,000.00	\$307,181.12
1874	301,610.42	55,000.00	356,610.42
1875	262,494.75	55,000.00	317,494.75
1876	262,584.00	55,000.00	317,584.00
1877	236,155.50	55,000.00	291,155.50
1878	198,255.75	55,000.00	253,255.75
1879	262,447.50	53,000.00	317,447.50
1880	262,400.25	55,000.00	317,400.25
1881	262,594.50	55,000.00	317,594.50
1882	261,885.75	55,000.00	316,885.75
1883	262,295.25	55,000.00	317,295.25

The increasing facilities for safe trading with this newly acquired territory, are to be credited to such explorations and surveys of intricate passes and harbors as have been made by the expeditions named in this volume. The purchase of Alaska has been fully vindicated.

SMALL LOSS OF LIFE.

To these statements of results may be added with interest the fact that the loss of life in these Arctic Explorations has been remarkably small. The number of deaths occurring in all the ships of the expeditions sent for the relief of Franklin, and on those engaged in later Arctic explorations up to the date of 1873, had not equalled two per cent of the officers and men employed. Nor have the casualties in the recent German, English, Danish, Swedish, and American expeditions equalled those ordinarily occurring among the ships on naval duty in other regions of the globe. They bear an inappreciable proportion to the losses in the Merchant, and especially the Whaling Marine, in proof of which it is enough to recall the statement of Lieutenant Maury, "that the losses by wreckage around the British Isles during a single year, exceeded the aggregate of all those within the history of Arctic exploration."

CONCLUSIONS.

It has been shown, in the beginning of this volume, that Exploration in the Arctic Zones had its origin in the desire to find a Northwest passage from Europe to the Indies, a problem which involved a crossing at or near the Pole. The history of these efforts has also shown the other more valuable purposes of the Expeditions which they themselves from time to time developed, the extension of Geographical discovery, and of the domain of Science in its various departments, to which must be added the more direct material benefits to Commerce and Navigation.

The problem of the Northwest passage is no longer looked upon as of hopeful solution or utility. Science has ceased to expect from its discovery the advantages for commerce and navigation, the hope of which stimulated the Explorers; and perhaps less can possibly be realized from the justly-renowned completed Northeast passage around Asia than this, at first sight, seems to promise. Yet the incidental results of each of them possesses high value. Maury may again be quoted:

"The expeditions which have been sent to explore unknown seas have contributed largely to the stock of human knowledge, and they have added renown to nations, and lustre to diadems. Navies are not all for war. Peace has its conquests, Science its glories; and no navy can boast of brighter chaplets than those which have been gathered in the fields of geographical exploration and physical research."

Of the problem of the Pole, Lieutenant Payer, of the German North Polar Expedition of 1869, has justly said that "it aims at determining limits of land and water, at perfecting that network of lines with which comparative science seeks to surround our planet, even to the Pole, the discovery of the physical laws which regulate climates, the currents of the atmosphere and the sea, and the analogies of geology with the earth as we see it."

It must be admitted that the hope of reaching the ninetieth degree of the north or south latitude is not encouraging. The Paleocrystic ice forms an impenetrable barrier, a conflict with which by the strongest iron-built *ship* were hopeless, and the forewarnings of Barrow, expressed to the Royal Geographical Society more than forty years ago, against all efforts toward the extremest north by *sledging*, have confirmed themselves in the severe experiences of Markham, in lat. 83° 26' N. Even that reserved,—one might say the forlorn hope—of theorists, the Bering Strait route, has been eliminated by the saddening shadows of the "Jeannette," an elimination in itself of high value.

It is safe to say that at least long years must elapse before even American or English liberality will sanction an expedition for the bare purpose of reaching the Pole. Volunteers from naval and civil life are still ready to offer themselves for the fascinations of the most daring Arctic adventure, but no branch of the United States Government will lend an ear. But, for the further prosecution of researches in the collateral branches of Science, for the extension of geographical knowledge, of commerce, civilization, and Christianity, new expeditions will be set on foot. Arctic Exploration will not soon be abandoned. Baron Nordenskiöld is at this moment reported as proposing an expedition to the Antarctic, in which ocean no expedition has attempted to make any *persistent* exploration, or even to winter there.

"England," says Maury, "through Cook and Ross; Russia, through Bellingshausen; France, through D'Urville; and the United States, through Wilkes, have sent expeditions to the South Sea." With any remembrance of the unprecedented appliances bestowed by Science on this generation, who shall say that by some still further advance problems will not be solved on which the fullest light can be thrown only by researches in the regions in which nature exerts her extremest forces? With these results will also be reaped the extension of the blessings of civilization to races as untutored as unknown. To-day the Fiji Islanders seek a confederation with Australian interests. But before the explorations in the Antarctic Sea, what were Australia itself and New Zealand but cannibal lands? What limit can be set to the result of exploration and survey, and the closer intercourse of the nations? What limit to the advancement of knowledge, which for its advance needs the extension of research to the furthest possible bounds?

While the pages of this volume were upon the press, preparations were being made for the relief of the party at Lady Franklin Bay, and the remains of De Long and his comrades of the "Jeannette" were received with appropriate obsequies in New York.

The Board of Officers appointed to recommend a plan for the relief of the Greely expedition, consisting of Gen. W. B. Hazen and Capt. G. W. Davis of the Army, and Capt. J. A. Greer and Lieut.-Com. B. H. McCalla of the Navy, had made a report which had been approved by the Secretary of the Navy. Sanctioned by Act of Congress, it effected the placing of the outlay for the expedition entirely at the discretion of the President.

A memorable feature in the history of the United States Expedition for the relief of Lieut. Greely is the addition of a gift vessel from the British government, the "Alert," the advance ship of Sir Geo. Nares' Arctic Expedition of 1875. This ship is peculiarly fitted for the intended service, and, as will be remembered, wintered in Lady Franklin Bay. This international courtesy, accepted by the President and Congress, is a grateful reciprocation of the presentation by the United States

of the "Resolute," of Sir E. Belcher's Franklin Squadron, a ship picked up at great personal risk at sea by Capt. James Budington of New London, and delivered to Queen Victoria by Capt. Hartstene in person, after his own rescue of Kane. Thus are linked the imperishable deeds of noble daring and of national good-will: proving the story of Arctic adventure to be fraught with exhibitions of the finest traits of elevated purposes and of characters formed by Arctic experience and Arctic study.

At the date of October, 1884, it is found practicable to resume the thread of the narrative, and record the chief closing events of the expeditions under De Long, Greely, and Ray, with notes of the explorations carried on in and around Alaska, on the shores of which, the work of the United States Coast and Geodetic Survey, while delineating its coast-line, has added largely to our stores of geographical and ethnological knowledge.

Their work, with that of the Revenue Marine, here proves of growing value to the whale, the seal, and other fisheries, and to the opening up and settlement of the Territory.

THE BURIAL OF THE DEAD FROM THE LENA.

After an absence of more than two years spent in vain searches for traces of Lieut. Chipp and the crew of the second cutter (see pp. 402-3), and in arranging with the Russian authorities for bringing to the United States the remains of De Long and his comrades discovered on the Lena, Harber and Schuetze landed, February 21, at Hoboken, N. J., with the bodies of the ten buried there by Melville. On their metallic caskets, which the United States Congress had sent out for them, were now seen silvered and floral offerings placed upon them in the city of Orenburg; one bore the inscription, in English and Russian, on a silvered shield,—

* * * * *
 *
 * TO THE MARTYRS OF SCIENCE. *
 * ORENBURG DIVISION OF THE IMPERIAL RUSSIAN *
 * GEOGRAPHICAL SOCIETY, *
 * ORENBURG, JANUARY 24, 1884. *
 * * * * *

A volunteer guard from one of the New Jersey State regiments kept watch the first night, relieved in the morning by a naval detachment. February 22, the anniversary so dear to Americans, an immense funeral procession moved from the Battery, New York, at the first mid-day salute from the fort on Governor's Island,—a salute echoed by the shipping in the harbor, flags falling to half-mast. The bells of New York and Brooklyn tolled while the cortege wound up the chief street of the great city, conveying, in military order, the remains of Kaack, Lee, Iverson, Dressler, Boyd, Gortz, Ah Sam, Collins, Ambler (a vacant pall for Chipp), and the floral covered casket of De Long. On each side of this walked his classmates of the years gone by at the Naval Academy,—Amory, Barber, Brownson, Buford, Craig, Hitchcock, Hubbard, Livingston, Newell, Noel, Perry, and Thomas; next, the few survivors of the expedition,—Danhower, Melville, Newcomb, Bartlett, Nindemann, Noros, Tong Sing, and Wilson,—followed by Berry and Hunt of the relief ship "Rodgers," the carriages of Mrs. De Long and immediate relatives, and those of many invited friends, among whom with the Secretaries of the Navy and of War, were the Russian Minister, chiefs of the Naval Bureaus, and the Mayors of the two cities, Brooklyn and New York.

Crossing the great suspension bridge, the procession entered the walls of the Navy Yard, Brooklyn, and left the remains in its safe keeping for burial on the following day. The 23d recalled the gloom of the *Lena*. The caskets, brought again to the city, were borne to the several places which awaited the last rites of religion: De Long and his men, except Boyd, were buried in Woodland Cemetery; Ambler, in his native county of Fauquier, Virginia; Boyd, in Philadelphia; Collins, beside his mother in far distant Ireland.

The exhaustive search for the second cutter's crew, made on the Siberian shores previously by Melville, and renewed by Harber and Schuetze, had sadly set to rest all doubts as to their fate. Not a trace of the eight of the cutter could be discovered either by personal search or by the closest communication with the three hundred natives who had been in every part of the Delta during the previous summer. The boat and all in her undoubtedly perished in the gale of September 21, 1881.

Thus ends the sad but not unprofitable record of the "Jeannette Expedition." It must be accredited with the honorable purposes of the extension of geographical knowledge, and the solution of the polar problem by a route not previously attempted with directness, and with the higher purposes of scientific investigation. It was officered by those who by their skill and fortitude shown through the weary months of ice-imprisonment, the trials of the boat voyage and the *Lena*, demonstrated their ability to accomplish their purposes, if these could have been found possible. Yet it must ever be regretted that their plans were defective. The theories abandoned by the commander (pages 388-9) certainly return upon their authors some share of responsibility; the plans of the cruise failed in their limitation of it to a single ship, and to the assistance of so few natives — always the essential dependence of the Arctic voyager.

Yet it may not be said that history records this expedition as a failure; even the elimination of the route itself is a gain of value, secured only by sacrifice, but saving the lives of many aspirants to press toward the pole by this hopeless "gateway."

CHAPTER XIV.

THE RELIEF OF THE GREELY EXPEDITION.

THE SIGNAL SERVICE OBSERVERS AT LADY FRANKLIN BAY. — THE RELIEF PROVIDED. — THE OFFICERS IN COMMAND. — NEWS OF THE RESCUE. — THE CRUISES OF THE THREE RELIEF SHIPS. — THE GREELY RECORDS FOUND ON THE ISLAND. — THE RETURN OF THE RELIEF SHIPS TO THE UNITED STATES. — THE OUTLAY.

THE hope expressed on page 551 of this volume, that “a well-equipped party would find the long-absent explorers under Lieutenant Greely safe after their endurance of three Arctic winters,” met with severe disappointment. The compelled abandonment of the post, the retreat to Cape Sabine, and the survival of but six of the twenty-five of the party, clouded many homes with a gloom relieved only by the value of the results secured, and the exhibitions of sterling qualities of skill and of fortitude through severe suffering.

Lieutenant Greely sustained his men without serious loss of any form from the date of his establishing himself at Fort Conger to the hour of his abandonment of it on the failure of receiving relief in the summer of 1883. No case of scurvy occurred during this period. The two years' station duties, observations, explorations, and the retreat to Cape Sabine, were all accomplished without loss of life, disease, or serious accident. To his honor, and to that of the American name,

through the liberal provision made by the Signal Service, and the fidelity exercised in the responsible position held, for the first time in the world's history continuous research was made for so long a period at a post so far north. The acknowledged value of the observations, and the geographical explorations and discoveries made under the lamented Lockwood, have secured also an advanced point in Arctic history, and the plans for relief, the nation's liberal grant for their execution, and the prompt success secured, reflect honor on all who participated in them.

As stated on page 537, Greely's colony was located with the idea of its being the first to occupy a permanent station north of the eighty-first parallel; annual visits to it being contemplated, as named in the Act of Congress authorizing the expedition, to carry supplies, and, if necessary, take out new members to fill the places of invalids. The provisions first taken were ample for a term of more than the two years of Greely's proposed stay; he had also reasonable ground of expectancy that relief would reach him, if not in 1882, certainly in the year following.

His unprecedented crossing of the bay must have strengthened these hopes; but the failure of all coming of relief by the nipping of the "Neptune," and the crushing of the "Proteus," left him with the sole dark necessity of attempting a return without the hope of ample provisions by the way. Happily, his own good judgment dictated a retreat before the latest date named in his orders, September 1; and, abandoning Fort Conger August 9, after a fearful struggle with the ice-masses, on which he drifted at one time for thirty days, he established his party Oct. 21, 1883, at a point about five miles below Cape Sabine, but with the scantiest wreck of provisions for wearied men, and this at the coming of an Arctic winter. The story of his rescue and of the suffering state of the few survivors of that winter finds its fitting place at this point of the narrative.

THE RELIEF PROVIDED.

The Board of officers named on page 563, during their session of two months, from Dec. 20, 1883, to Feb. 21, 1884, received the testimony

of a number of Arctic travellers and experts, among whom were survivors of the Jeannette Expedition, Lieutenant Berry of the "Rodgers," Schwatka of the Franklin-RECORD search, Tyson of the "Polaris," and Kennan of the Overland Telegraph Expedition of 1867. They were also favored with letters from Sir George Nares, Captain Markham, and Major Fielden of the English Expedition of 1875. Reciting the failures of the two attempted reliefs sent out by the Signal Service, and the hopes of rescue founded on the abundant supply of provisions known to have been at Greely's command, the Board recommended the purchase and dispatch of two strong whaling or sealing ships, provisioned each for a cruise of two years, that in the event of the loss of one, the second might continue the search — a provision most unhappily failing each exploring expedition as far back as to the first one under De Haven. They also advised the dispatch of an advance vessel to reach the Danish settlements previous to the date assigned for the assembling of the relief ships at Upernivik; and to complete every provision for relief as dictated by the promptings of humanity, recommended further, that a bounty be offered to any whaling ship "which should rescue or render material assistance to Greely, if found by her north of Cape York, and at a time when no United States vessel should be in sight." To this last recommendation and its acceptance by Congress full credit will be accorded, since success by the whaler might seemingly compromise the honor of the Naval officers who would go out; on the other hand, delay to the Naval ship which might arise from her relief to an imperiled whaler, might fatally affect the whole object of the nation's efforts. Happily, no occasion was met with for such delay. Secretary Chandler, immediately on receipt of the preliminary report of the Board, Jan. 22d, 1884, in advance of action by Congress, purchased the "Bear," a strong Arctic sealer of the St. Johns fleet, and on the 15th of the month following, the "Thetis" of Dundee. The "Bear" had made nine successful Arctic cruises; at the Brooklyn Navy Yard she was now thoroughly refitted at a cost of more than \$20,000. The "Thetis," one of the strongest of the Dundee whalers, after inspection at that port, was accepted at the price of \$140,000, and sailed for New York February 29th under the command of Lieutenant

L. L. Reamey, U. S. N. The "Alert" was, as has been named, a presentation from the English Government.*

The "Bear" and the "Thetis" were regarded, when purchased, as in good order and well suited for the Arctic cruise; yet the Board of Survey ordered by the Department reported that they deemed it necessary "to take apart all the machinery for examination, and to recommend everything that might be of service during a long separation from engineering facilities." The selection of the ships and their equipment was thus in every way as judiciously made as the early instructions of the Secretary could secure. His prompt and watchful care that the expedition should be equal to the emergency, and should be dispatched in season, showed itself in the circulars to the chiefs of the Bureaus and their subordinates, of which an example is furnished in the letter of February 4, in which he said:—

"Difficulty has been experienced in starting to sea vessels of the navy at the dates fixed for sailing. 'There must be no such failure in the case of this expedition. You will promptly call the attention of the Department to any questions upon which you wish decisions or explicit directions. You will give all practicable personal attention to the business in all its details, trusting as little as possible to other persons. You will communicate freely with the chiefs of the other Bureaus and with the commanding officer of the expedition.'"

It is to the credit of the Navy that such instructions at Washington and at the Brooklyn Yard were literally fulfilled.

* The steps of this international courtesy are worthy of record. Feb. 2, 1884, United States Minister Lowell cabled to the State Department a letter received from the First Lord of the Admiralty. "My dear Mr. Lowell; Commander Chadwick has mentioned in conversation with Sir Cooper Key, that her Majesty's ship 'Alert' might be of use to the United States Government in an expedition to be dispatched in search of the expedition which is missing in the Arctic regions. I write a line to say that we have not forgotten the very considerate conduct of the Government of the United States on the occasion of the recovery of the 'Resolute,' and that if you should be instructed to make any suggestion through the usual official channel that the 'Alert' would be of any use to the United States Government, we shall be happy to ask your acceptance of her as a present.

(Signed) "NORTHBROOK."

To this suggestion the Secretaries of the Navy and War replied: "It is concluded that the 'Alert' would be the best advance vessel for the expedition. Ask British Government if she can be spared to us for the service." The prompt response of the next cable read: "Ship an unconditional gift, anchor and chains and equipment." Refitted by England, she was commissioned March 25 under the Stars and Stripes, and sailed on the 29th under command of Lieut. Com. C. F. Goodrich, U. S. N.



WINFIELD SCOTT SCHLEY, U. S. N.

Entered the U. S. Naval Academy, Sept. 20, 1856; Graduated as Midshipman, June 15, 1860; Promoted to be Master Sept. 19, 1861; to be Lieutenant, July 15, 1862; Lieutenant-Commander, July 25, 1866; Commander, June 10, 1874. Appointed Chief of the Bureau of Equipment and Recruiting, with rank of Commodore, Sept. 6, 1884.

THE OFFICERS IN COMMAND.

From a list of volunteers subjected to physical examination additionally to that of their official record, Commander W. S. Schley was selected by the Secretary of the Navy Feb. 18, 1884, for the responsible post of command of the expedition, and on the 17th of March submitted his plan of the cruise. Under the dispatch at the Navy Yard which has been referred to, he received, April 21, his final orders in terms which, it will be seen (like those given to Dehaven), necessarily left him largely to his own discretion and responsibility in the Arctic regions.

"SIR, — The 'Thetis,' 'Bear,' and 'Alert,' the ships of the Greely Relief Expedition of 1884 being ready, you are ordered to take command of them and proceed to the coast of Greenland or further north, if necessary, and, if possible, to find and rescue or ascertain the fate of Lieutenant A. W. Greely and his comrades.

"All the officers and men under your command are hereby enjoined to perform any duty, on sea or land, to which you may order them.

"No detailed instructions will be given you.

"Full confidence is felt that you have both the capacity and the courage, guided by discretion, necessary to do all that can be required of you by the Department or the nation for the rescue of our imperilled countrymen.

"With earnest wishes and high hopes for your success and safe return, I am, very respectfully,

"W. E. CHANDLER, Secretary of the Navy."

Two days after the receipt of these instructions, the "Bear," as the advance ship of the expedition, left New York under command of Lieutenant W. H. Emory, whose chief officers were Lieutenants Crosby and Colwell, Ensigns Usher and Reynolds, Chief Engineer Low, and Passed Assist. Surgeon Ames. The flag ship "Thetis" followed May 1, Commander Schley having as his chief officers Lieutenants Sebree, Taunt, and Lemley, Ensign Harlow, Chief Engineer Melville of the "Jeannette," and Assistant Surgeon Green. The "Alert," under Lieutenant-Commander Coffin, with Lieutenants Badger and Hunt of the "Rodgers," got to sea nine days later.

The "Bear" and the "Alert" were under strict instructions to proceed with dispatch to Godhavn and Upernivik; the "Bear" to await at Littleton Island the coming of the "Thetis"; the "Alert" to erect



RESCUE OF LIEUT. GREELY AND THE SURVIVORS OF HIS PARTY.

a house at Hayes's old quarters, Port Foulke, for storing provisions; both ships to advance to Cape Sabine, keeping by the way the most vigilant outlook for signals, and making every possible effort even by organizing sledge parties, if expedient, to discover a trace of the suffering explorers.

NEWS OF THE RESCUE.

July 17, 1884, the "Thetis" and the "Bear," arriving at St. Johns, N. F., electrified the civilized world by dispatches which announced the cruise, the attempted return of the explorers, their sufferings near Cape Sabine, and the rescue and survival of but six of the expedition. At a point about five miles from the Cape, June 22, Commander Schley had found Lieutenant Greely and six of his men at the last stage of exhausted life — one of these soon after died; nineteen, including the two lieutenants and the surgeon, had perished; five of these, buried in the ice foot, had been swept out to sea; of the two Eskimos, one had been drowned while sealing, the other was buried by the Relief Expedition at Godhavn on their return; the remains of twelve were on board the ships, for burial at their homes. Lieutenant Greely telegraphed as follows: —

ST. JOHNS, N. F., July 17, 1884.

CHIEF SIGNAL OFFICER, Washington.

Brainerd, Biederbick, Connell, Fredericks, Long, myself, sole survivors, arrived to-day, having been rescued at point of death from starvation by relief ships "Thetis" and "Bear." All now in good health, but weak. . . . [Names of the dead.] Abandoned Fort Conger Aug. 9. Frozen in pack off Victoria Head Aug. 29. Abandoned steam launch Sept. 11, eleven miles northeast of Cocked Hat Island. When on point of landing, three times driven by southwest storms into Kane Sea. Finally landed, Sept. 29, in Baird Inlet. Learning by scouting parties of "Proteus's" disaster, and that no provisions had been left for us from Cape Isabella to Cape Sabine, moved and established winter-quarters at Camp Clay, half-way between Sabine and Cocked Hat. Inventory showed, March 1, that party would have ten days, full rations left for crossing Smith's Sound to Littleton Island. Unfortunately, the Sound remained open the entire winter, rendering crossing impossible. Game failed despite daily hunting from early February. Before sun returned only five hundred pounds of meat obtained. This year minute shrimps, sea-weed, sassafras, rock lichens, and sealskin were resorted to for food, with results as shown by number of survivors. Last regular food issued May 14. Only one hundred and fifty pounds of meat left by Garlington compelled me to send November, four men to obtain one hundred and forty-

four pounds English meat at Isabella. During trip, Elison froze solid both hands and feet, and lost them all, surviving, however, through our terrible winter and spring until July 8. Survivors owe their lives to the indomitable energy of Captain Schley and Lieutenant Emory, who, preceded by three and accompanied by five whalers, forced their vessels from Upernivik through Melville Bay into North Water at Cape York with the foremost whaler. They gained a yard whenever possible, and always held it. Smith's Sound was crossed and party rescued during one of the most violent gales ever known. Boats handled at imminent risks of swamping. Four of us then unable to walk, and could not have survived exceeding twenty-four hours. Every care and attention given us. Saved and bring back copies meteorological, tidal, astronomical, magnetic, pendulum, and other observations. Also pendulum, Yale, and standard thermometers.

For the first time in three centuries, England yields the honors of the farthest north. Lieutenant Lockwood and Sergeant Brainerd, May 13, reached Lockwood Island, lat. $83^{\circ} 24'$, lon. $40^{\circ} 46'$. They saw, from two thousand feet elevation, no land north or northwest, but to northeast, Greenland yet extended, lost to view in Cape Robert Lincoln, lat. $83^{\circ} 35'$, lon. 38° . Lieutenant Lockwood was turned back in 1883 by open water on North Greenland shore, — party barely escaping drift into Polar Ocean. Dr. Pavy in 1882, following Markham's route, was adrift one day on Polar Ocean north of Cape Joseph Henry, and escaped to land, abandoning nearly everything. In 1882 I made a spring, and later a summer trip into interior Grinnell Land, discovering Lake Hazen, sixty by ten miles in extent, which, fed by ice-caps of north Grinnell Land, drains by Ruggles River and Weyprecht Fiord into Conybeare Bay and Archer's Fiord. From summit of Mount Arthur, five thousand feet, the contour of land west of Conger Mountains convinced me that Grinnell Land tends directly south from Lieutenant Aldrich's farther in 1876. In 1883 Lieutenant Lockwood and Sergeant Brainerd succeeded in crossing Grinnell Land, and ninety miles from Beatrice Bay, the head of Archer's Fiord, struck head of Fiord from Western Sea, temporarily named by Lieutenant Lockwood, Greely Fiord. From centre of the Fiord in lat. $80^{\circ} 30'$, lon. $78^{\circ} 30'$, Lieutenant Lockwood saw northern shore terminating some twenty miles west, and southern shore extending some fifty miles, with Cape Lockwood some seventy miles distant, apparently a separate land from Grinnell Land. Have named new land Arthur Land. Lieutenant Lockwood followed, going and returning, an ice-cap averaging about one hundred and fifty feet perpendicular face. It follows that Grinnell Land interior is ice-capped, with a belt of country some sixty miles wide. Between Northern and Southern Ice Cap, in March, 1884, Sergeant Long, while hunting, looked from northwest side Mount Corey into Hayes Sound, seeing on northern coast three capes westward of farthest seen by Nares in 1876. The Sound extends some twenty miles farther west than shown by English chart, but is possibly shut in by land which showed up across its western end. The two years' station-duties, observations, all explorations, and retreat to Cape Sabine, all accomplished without loss of life, disease, serious accident, or even severe frost-bites. No scurvy experienced at Conger, and but one death from it, past winter.

(Signed.)

GREELY, Commanding.



LIEUT. GREELY.

Lieutenant Adolphus W. Greely, U. S. A., Private, Corporal, First Sergeant, 19th Regt. Mass. Vol., July 26, 1861, to March 18, 1863; promoted to be Second Lieutenant, U. S. C. Infantry, March 18, 1863; to be First Lieutenant, April 26, 1864; Captain, April 4, 1865; Brevet Major, May 13, 1865; Second Lieutenant, U. S. Infantry, March 7, 1867; First Lieutenant, 5th Cavalry, May 27, 1873. In command of the Arctic Expedition, 1881-1884.

The same day Commander Schley closed his telegram to the Navy Department, by reporting, —

“From Hare Island to Smith’s Sound I had a constant and furious struggle with ice in impassable floes. Solid barriers of ice were overcome by watchfulness and patience. No opportunity to advance a mile escaped me, and for several hundred miles the ships were forced to ram their way from lead to lead through ice varying in thickness from three to six feet, and, when rafted, much greater. The “Thetis” and “Bear” reached Cape York June 18, after a passage of twenty-one days in Melville Bay, with the two advance ships of the Dundee whaling fleet, and continued to Cape Sabine. Returning seven days later, fell in with seven others of the fleet off Wostenholme Island, and announced Greely’s rescue to them that they might not be delayed from their fishing grounds nor be tempted into the dangers of Smith’s Sound in view of the reward of twenty-five thousand dollars offered by Congress. . . . The season north is late and the closest for years. Smith’s Sound was not open when I left Cape Sabine. The winter about Melville Bay is the most severe for twenty years.

“The Greely party are very much improved since rescue, but were critical in the extreme when found, and for several days after. Forty-eight hours’ delay in reaching them would have been fatal to all now living.”

The rescue was not a moment too early, as the condition thus reported by Greely and Schley, and further by Surgeon Green, plainly and most touchingly shows. Commander Schley’s photograph of the tent in which the few survivors were found huddled together, itself tells the story. Surgeon Green, in his official report, states that on being taken aboard the “Thetis” Greely fainted and vomited; that his body emitted an offensive odor; emaciated, with the skin hanging from the limbs in flaps; his eyes were wild and staring; his pulse but fifty-two; his weight reduced from one hundred and sixty-eight pounds to one hundred and twenty. He was unable to stand. Under judicious medical treatment, nutritive food, supplied at first in the smallest quantities, afterward with increase at five stated intervals, brought up the sufferer to nearly his original weight when arriving at Portsmouth. His restoration and that of his comrades were hastened by the immediate and continued kindnesses received from citizens, as well as by the full provisions for this personally made by the Secretary of the Navy. At the date of September 3, after having received, with Commander Schley, numerous congratulations from superior officers, from the Queen of England, the Geographical Society of Paris, and the English Arctic

explorers of 1875, Greely was able to read at the meeting of the British Association at Montreal, a paper describing in brief the results of this long-absent expedition. He stated as additional facts to those cited:—

“The geographical work of the Lady Franklin Bay expedition covers nearly three degrees of latitude and over forty degrees of longitude. Starting from lat. $81^{\circ} 44'$, and lon. $84^{\circ} 45'$, Lieutenant Lockwood reached, May 18, 1882, on the north coast of Greenland, lat. $83^{\circ} 24'$ and lon. $40^{\circ} 46'$. From the same starting point he reached to the southwest, in May, 1883, Greely Fiord, an inlet of the Western Polar Ocean, lat. $80^{\circ} 48'$ and lon. $78^{\circ} 26'$. This journey to the northward resulted in the addition to our charts of a new coast line of nearly one hundred miles beyond the farthest point seen by Lieutenant Beaumont, R. N. It also carried Greenland more than forty miles northward, giving that continent a much greater extension in that direction than it had generally been credited with. The vegetation resembled closely that of Grinnell Land. Among the specimens brought back, the Arctic poppy and several saxifrages were identified. About the eighty-third parallel, traces of the polar bear, lemming, and Arctic fox were seen, and a hare and ptarmigan were killed. Lieutenant Lockwood and myself journeyed across Grinnell Land and examined into its physical condition, discovering what may have been hitherto unsuspected, that between the heads of Archer and Greely Fiords, a distance of some seventy miles, stretches the perpendicular front of an immense ice-cap, which follows closely from east to west the eighty-first parallel. The average height was not less than one hundred and fifty feet. The undulations of the surface of the ice conformed closely to the configuration of the country, so that the variations in the thickness of the ice-cap were inconsiderable. In about sixty miles but two places were found where the slope and space were so modified as to render an ascent of the ice possible. This ice-cap, extending southward, covers Grinnell Land almost entirely from the eighty-first parallel to Hayes Sound, and from Kennedy Channel westward to Greely Fiord in the Polar Ocean. In connection with the line of perpetual snow, I may say that on Mount Arthur it was not far from thirty-five hundred feet above the sea. From barometrical measurements it appeared that the crest of Grinnell Land was of about twenty-five hundred feet elevation in front of the southern ice-cap and Cape Sabine I determined to be an island.

These statements, it will be seen, refer chiefly to the advance made toward the extreme north by Lockwood, and to the character of the section of Greenland thus reached. A report of the scientific observations made under the close instructions of the Signal Service was not then possible, and cannot be looked for until Greely's return to full health, and the proper comparison of the instruments used with the standards at Washington, and the necessary reductions and tabulations be made. These, it is understood, will require months of close and careful labor;



J. V. Lockwood
Lieut. U. S. Army

Commissioned Second Lieutenant, 23d U. S. Infantry, Oct. 11, 1873: on duty in Arizona, Omaha, Kansas, Indian Territory, and Colorado, 1873 to 1881. Volunteered for the Greely Expedition, May, 1881. Promoted to be First Lieutenant, March 15, 1883. Died at Cape Sabine, April 9, 1883.

but, the instruments having been found in good state of preservation, the happiest results are reasonably expected.

The remains of the lost of this expedition received full but generally quiet honors. Circumstances of peculiar apprehension and anxiety, in most cases happily relieved, made their last tributes thus private. Lieutenant Lockwood was buried in the cemetery of the Naval Academy at Annapolis; Lieutenant Kislingbury at Rochester, N. Y.; the subordinate officers at their homes in the different States, seven of which were represented in this volunteer expedition.

The value of the results of the expedition may be well accepted in the words of the Chief Signal Officer, U. S. A.:—

“The work done by the Greely expedition far surpasses in importance, completeness, and scope, that done by any other on record. This was made possible by a very careful and extended study beforehand, and then, colonizing there for two years, enabling the party to take advantage of two entire summer seasons for deliberate exploration. It has shown the fallacy of the old belief that fatal diseases, especially scurvy, were necessarily incident to Arctic life, and that life there was constantly menaced by the great cold. It has shown that with discipline, suitable clothing, proper and abundant food, and a good, suitably warmed house, men can live there in perfect health and comfort for a considerable period of time. This fact is corroborated by Lieutenant Ray’s experience at Point Barrow, where in two years he never had a man on the sick-report, and pronounced service there more safe than in Florida. The expedition has solved the question of Arctic exploration of the future, and, with the additional precaution of judiciously locating suitable depots with houses, the party never passing beyond until this is done, Arctic exploration will be robbed of its dangers and apprehensions.”

The New York “Tribune” justly says, —

“It has been accorded, both in the United States and abroad, that no story of American heroism and devotion to duty has ever made a deeper impression upon the public mind than the rescue of Lieutenant Greely and his companions. At first there was a foolish outcry in some quarters against Arctic explorations as involving terrible suffering and loss of life without offering in return any results of positive value to mankind. Happily, this clamor has already ceased, and Lieutenant Greely and the lamented Lieutenant Lockwood are now accorded the high honor of demonstrating anew that pluck, daring, and the spirit of adventure are still in the blood of American soldiers. They did not go north for any haphazard scheme of exploration. They volunteered for scientific work on a large scale, in conjunction with parties of trained observers from the European capitals. That work was faithfully performed, and the results have been carefully preserved. But they were not con-

tent with the mechanical service which was expected of them. They availed themselves of opportunities for extending the domain of human knowledge, and they did not retreat southward until they had obtained a great budget of new information, and had outlined coasts which had never before met the eye of man. The importance of the scientific work accomplished by this little band of American soldiers cannot be overestimated. It entitles them to the highest consideration at home and abroad, as successful contributors to the world's store of knowledge. Their labors, achievements, and heroic conduct reflect honor upon the American name."

THE CRUISES OF THE THREE RELIEF SHIPS.

To follow these in their search for the lost observers is to link them with the expeditions which during the ten years, from 1849 to 1859, by their persistent efforts for a like rescue, registered their names alongside of Franklin and our Kane. The "Alert" has her own special link to Arctic exploration; the "Thetis" and the "Bear" have placed themselves with directness on the roll of messengers sent out on errands of humanity to the weird regions of the far north.

The full report of the commander of the expedition of 1884 must be in the hands of those who would trace anew the dangers and the fascinations of the crossing into the North Water and the Kane Sea, the experience of Arctic life, and, it may be added, the honors and the welcome of successful return. By the courtesy of the chief, some insight to the cruise has been permitted, in advance of the publication of the history from his hands.

The general plan of the cruise contemplated, as has been named, the advance of the "Bear" to Disco, and as soon as possible to Uperviik, there to be joined June 1 by the "Thetis." The two ships would then proceed in company to Cape York, Littleton Island, and Cape Sabine, and, failing still of news of the Greely party, would advance to Lady Franklin Bay. The "Alert" reaching Littleton Island, it was hoped, not later than July 1, would there set up two framed houses taken out from the United States, and would land and store all her supplies, except those necessary for her own return, in order that a refuge should be established for any parties which might meet with disaster. It will thus be seen that a wide departure was now made from

such of the Arctic expeditions named in this volume as unwisely consisted of but one vessel.

If the "Thetis" or the "Bear" should not have returned to Littleton Island by September 1, the "Alert" would return with whatever news she could bring of the movements of her consorts.

May 3, Lieutenant Emory of the "Bear" cabled from St. Johns, N. F., to the Secretary of the Navy, that, according to the accounts received from the incoming sealers at that port, the season promised to be favorable for ice conditions; if, as might be expected, easterly gales had prevailed in the Arctic seas as they had prevailed near St. Johns, the ice had been set in motion much sooner than usual. The sealers had found unusual masses packed off the Straits of Belle Isle. No one of these steamers could give advice of the ice conditions north of Labrador, for they do not frequent a higher latitude; yet their observations and experience in their own sections of cruising determined Emory to try the Middle Passage through the Straits, and if his advance should be arrested, to push along the ice-foot to Disco and Upervivik. He reached Godhavn May 13, finding that several whalers had already arrived there. On the 21st only he was able to push into the pack toward Hare Island, a previous attempt having been blocked by impenetrable ice. Upervivik was reached within one day of the hoped-for date.

The "Thetis," sailing from New York May 1, experienced unusually fair weather, without ice, on her way to St. Johns, and met no field ice until she neared Cape Farewell, from which point she passed through open water to the south side of Disco Bay, where she again found herself among crowds of bergs. Crossing the Arctic circle May 21, Schley entered on the welcomed continuous daylight, facilitating every movement. By 9 A. M. of the 22d he was at Godhavn. Here he accepted the inheritance of a number of dogs ordered by Lieutenant Garlington on the cruise of the "Proteus," purchasing them from the Governor. Sailing on the 24th for Upervivik, in company with the collier "Loch Garry," the "Thetis" was compelled to clear the way in the outer harbor through an ice-belt of five miles, but made from that point a clear run to North Fiord, twenty-six miles south of the Waigat



WILLIAM HENSLEY EMORY, U. S. N.

Entered the U. S. Naval Academy, Sept. 23, 1862; Graduated, June, 1866; Promoted to be Ensign, March 12, 1868; to be Master, March 26, 1869; Lieutenant, March 21, 1870.

Straits. Pushing into the polar pack ice toward Hare Island, she soon fastened to an iceberg of some two hundred feet in height, from which she cast off on the 26th; near the Straits, lying again under the lee of a berg, its pivoting carried away the head-gear and figure-head of the ship; escape was made from the heavy closing ice by ramming through the lighter floes and blowing through the heavier by torpedoes. After the alternating experiences of making a few miles through leads which occasionally opened before the perpetual eye-watch of the commander in the crow's nest, of anxiously awaiting at times the lifting of the fog, and of tying up and then making a timely escape from a crashing berg, the "Thetis" arrived at Upernivik on the 29th, finding there with the "Bear," the Scotch whalers "Polynia," "Triune," "Nova Zembla," and "Wolf." At Tessuissak the two ships found three other whalers, the "Aurora," "Cornwallis," and "Narwhal," each of which vessels was thus much further north of her usual cruise of the season, through the inducements of the reward offered by Congress and cabled promptly to Europe. At Duck Island, the outpost from which advance is usually made across Melville Bay, the ships were detained five anxious days by violent gales and snow-storms; but a lead was then opened by ramming, now found to be the more severely imperative the further north in the advance. Torpedoes and gun-cotton, on which some reliance had been placed, proved of effective value for local use only; on the 12th, but one mile could be gained. Cape York and Conical Rock were reached on the 18th, and a cache left for the commander of the "Alert;" nothing whatever could be learned of the Greely party. Immediately after gaining the Cape the land ice was seen to extend unbroken and impassable for a distance of sixty miles. The "Thetis" and the "Bear" gained Payer Harbor June 22.

Immediately on the arrival at the harbor, four parties were simultaneously organized for the search. Lieutenant Taunt, in charge of one company, examined the cairn on Brevoort Island; Ensign Harlow, that on Stalknecht Island; Lieutenant Colwell, the wreck-cache west of Cape Sabine; and Chief Engineer Melville, the coast line.

At 7.30 P. M. cheers were indistinctly but unmistakably heard above the roaring elements, and in a short time seaman Yewell, of Taunt's

party, brought to the commander the records of the expedition left by Greely on the island, and which now guided to his camp. The sight of these papers excited in the officers and men on the ships the most intense desire to hasten to the shore. When Colwell had reached it, Sergeant Long was seen reclining on the rocks, too weak to secure any longer the usual scanty sustenance which they at times afforded. Taking him into the cutter, Colwell soon found Greely, and informed him that relief was at hand. The tent in which he and his few surviving comrades were, had blown down under the violence of the storm which was beginning to rage, nor was it in the power of the inmates to raise it.

Commander Schley and his officers arrived at 9 P. M., to find Greely in his sleeping-bag, his head reclining forward, his remaining strength being exercised in apparently reading from the prayer book to Sergeant Connell, who was in a dying state. His pulse was at a low ebb, and he was cold to the waist.

The feeling of the officers and men looking upon this scene can be more easily imagined than described. The sight of the officer thus attempting in his own desperate condition to minister consolation to a dying companion brought tears to the eyes of the stoutest. Greely was found to be physically the weakest, but mentally the strongest of the little company, and yet his condition may be inferred when it is told that he at first asked whether the visitors were not Englishmen; on learning who they were, he could only say, "I am glad to see you."

Everything around the tent was disheartening in the extreme. The place itself was one of the barrenest and the bleakest. Around the camp was seen nothing but ice, snow, and the glaciers; within, nothing save a few scraps of boiled sealskin and the show of implements of cooking and of worn out garments, while within sight of the sufferers was the row of graves, from some of which the heads and feet of those last attempted to be buried protruded. Privates Henry and Schneider lay entirely uncovered on the ice-foot.

Next after prompt care of the survivors, to whom food, even, was at first most cautiously administered, equal care was had for the dead. Their bodies, exhumed, were borne to the ships, each completely identi-

fied and ticketed to preserve the identification; on board ship they were carefully guarded until tanks could be prepared with the alcohol necessary for their preservation on reaching a change of climate. Every one was found intact except Lieut. Kislingbury and Jewell, Ralston, Whistler, Henry, and Ellis, from whose bodies the fleshy parts to a greater or less extent had been cut away. The survivors, the last-named unfortunate ones, and the five who had been buried in the ice-foot but had been swept away by ruthless storms, made up the record of names for the work this tempestuous night. Before morning the gale increased to a hurricane. It was well that by 11 P. M. the survivors had been gotten ashore, some resuscitation, in their cases, having been effected; less hopefully, in that of Elison, whose survival from the first seemed hopeless. The ships' heads had been with much difficulty kept to the wind, and with much greater danger and hardship the boats had crossed and recrossed to the beach.

THE GREELY RECORDS FOUND ON THE ISLAND.

An examination of the records on the ships after their return from the beach revealed points of deep interest in the history of the scientific observations and explorations of the year 1882-1883, and of the sufferings of the observers during the year which followed. The worn paper said that,—

The winter of 1881-2 proved to be of remarkable severity; the corrected mean for February, of a thermometer on the floe, was -48.03 . Musk ox meat was procured in large quantities, and other game to a less extent. Lieutenant Lockwood, during the autumn, explored "the Bellows" and the valley of St. Patrick's Bay, and attempted in November, twenty-one days after the sun left us, to cross Robeson Channel, but was obliged by open water and heavy ice to turn back several miles from Cape Beechy. Starting eleven days before the sun returned, he examined Robeson Channel off Cape Beechy, and leaving March 1, visiting Thank God Harbor *via* capes Beechy and Lupton, returned *via* Newman Bay and Cape Sumner, March 11, having been detained by violent storms. Dr. Pavy visited Lincoln Bay in September, established depots in Wrangell Bay in October, and near Mount Parry in November, returning on the eighth, and between March 5 and 9, 1882, established a depot near Cape Sumner. October 2 he started to visit Cape Joseph Henry, but was turned back by open water at the "Black Cliffs." He leaves March 18, 1882, to reach, if possible, north of Cape Joseph Henry. Lieutenant Lockwood leaves April

1 to explore the land north and east of Cape Britannia. The commanding officer proposes later an attempt to reach the western shore of Grinnell Land *via* Black Cliffs Valley. The health of the command has continued excellent to the present time. No signs of scurvy, except possibly Eskimo Jens; all well at present date (March 15, 1882). The winter has passed comfortably and pleasantly.

A. W. GREELY,

1st Lieutenant 5th Cavalry,

Acting Signal Officer and Assistant Commanding Expedition.

This record is deposited by Octave Pavy, who was leaving Fort Conger, October 27, 1882, with party of D. L. Brainerd. — October 31, 1882.

This record was taken up by Lieutenant Greely, August 12, 1883, and party going Sd. to Littleton Island.

THE SECOND PAPER READ.

FORT CONGER, G. L., OCTOBER 26, 1882.

During spring and following summer, 1882, the following trips have been made: A. A. Surgeon O. Pavy left March 19 to reach land north of Cape Joseph Henry, but returned May 4, having found open water in the Polar Ocean, where he was for a time afloat with his party on the moving ice pack.

Lieutenant J. B. Lockwood left April 3, and returned June 2, having in the meantime discovered Hazen Coast, which extends northeastward from Cape Britannia to $83^{\circ} 30' N.$, and about $38^{\circ} W.$ He reached $83^{\circ} 24' N.$ and about $38^{\circ} W.$ No land directly northwest, although horizon was searched on clear days from altitude of over two thousand feet. The coast still continued its trend to the northeast. The commanding officer, penetrating the interior of Grinnell Land in April, and again in July, discovered a lake about sixty miles by eight, called it Lake Hazen, and reached Mount C. A. Arthur $81^{\circ} 13' N.$, $74^{\circ} W.$, whence from an elevation of forty-five hundred feet a view was had on a very clear day. Low land to the W. S. W. and S. as far as eye could reach.

In W. S. W., in slight depression from seventy-five to one hundred miles distant, a range of mountains which possibly are on a land separate from Grinnell Land by a narrow strait. During August, launch "Lady Greely" ran to head of Archer Fiord and part way into Howgate Fiord, which latter inland from Miller's Island receives the water of Lake Hazen *via* Ruggles River. No casualties to date; all well at present. In case of no vessel, the station will be abandoned Aug. 11, 1883, the party retreating by boats along the west coast of Kennedy Channel and Smith's Sound.

A. W. GREELY,

1st Lt. 5th Cav., A.S.O., and Asst. Com. Expedition.



THE THIRD PAPER READ.

Record left by Lieutenant Greely, commanding Polar Expedition, en route to Littleton Island, with ultimate intention of reaching S.E. Cary Island.

I abandoned Fort Conger, G. L., Aug. 9, 1883, at 3 P. M., with party of twenty-five, all well. Reached Cape Baird August 10, and left same evening near midnight, steam launch "Lady Greely" towing boats "Valorous," "Beaumont," and whale-boat. On board 5500 lbs. coal and over forty days' rations. Took up enough at Cape Cracroft to make forty-five days' rations. Had foggy weather, with snow; met some ice. Reached Carl Ritter Bay about 10 P. M. August 12, and took up cache, leaving at once with about fifty days' complete rations, except sugar. Stopped by floes about 80° 43' N., morning August 13. Took up depot of two hundred and forty rations at Cape Collinson, August 22, and at 1 P. M., August 23, tied up to ice foot about two miles south of Cape Norton Shaw. Stopped by dense rubble ice, which extended as far south as could be seen. All well at that time. Reached Cape Hawkes August 26, took up 168 lbs. potatoes, 111 lbs. pickles, 250 lbs. bread, 324 stearine. Left same afternoon, and were beset that night in about 73° W., 79° 25' N., in attempting to reach Victoria Head by direct course. All well Aug. 27, 1883. No sign of a ship or of depots for us have been seen, although the shore has been carefully followed and watched. A northeast gale forced us down to 79° 00' 06" N., 74° 45' W., where temperature fell, September 8, to -0.8, freezing in the party. It is the intention to abandon launch "Lady Greely" and one boat Monday, September 10, and reach Cape Sabine with two boats by sledge *via* Cocked Hat Island. Party all well and in good spirits at date. Have about (40) forty days' rations complete. It is intention, as soon as separation shall be safe, to send an officer and two men to Brevoort Island to obtain record, which should be there, of the movement of ship and location of depot this year. If boats have been left us there, it will greatly facilitate our movements and increase our chances of safety. Abandoned launch September 10, and later, one boat. Driven into the middle of Kane's Sea twice by southwest gales; once from three miles off Cocked Hat Island, and again from about same distance from Cape Sabine; yet later, when within two miles of Brevoort Island, driven by a northwest gale and ice pressure to north side Baird's Inlet, between Leffert and Alfred Newton glaciers of admiralty chart, or just north of Cape Patterson, Nares' map.

Reaching land September 29, with one boat, twelve-man sledge, twenty-five days' rations. Party of twenty-five all well yet, and hopeful of future. Lieutenant Lockwood probably starts for Sabine October 1, and will deposit this record.

If no rations except English are found they will be hauled away to this point, and Cape Isabella visited by sledge in hope of finding another there. As a forlorn hope, when rations are reduced to ten days, an attempt will be made to reach Littleton Island by sledge, leaving records and cairn here with boat; records to be not

exceeding twenty-five feet from boat. Pendulum and duplicate records will be cached at site of English depot by Lieutenant Lockwood.

Hope to obtain game enough to keep us alive until February, when will start for Littleton Island as soon as permits travelling.

A. W. GREELY,

September 30, 1883,
North Side of Baird Inlet.

1st Lt. Cav., A. S. O., and Asst. Com. Expedition.

Visited Brevoort Island for maps and records in English cairn. Our party winter under desperate circumstances, in imminent danger of starvation, on north side of Baird Inlet, all well; twenty-five yet in party.

A. W. GREELY,

September 30, 1883, North Side Baird Inlet.

1st Lt., &c.

The fourth paper was a record by Sergeant Rice:—

Left Lieutenant Greely's party at north side of Baird Inlet on October 1, accompanied by one Eskimo, and arrived at Payer Harbor yesterday, October 5. Encountered great difficulties in travelling, Rosse Bay and all its ramifications open entirely, and a strait found opening out to the west of "Cocked Hat" Island, and separating Sabine from mainland, had to be followed on the inside throughout its entire length.

Travelled through thick weather yesterday, and did not see cache landed from wreck of "Proteus," and mentioned in Lieutenant Garlington's notice, but found depot of two hundred and forty rations marked by tripod all right. Boat damaged as stated. The cache of clothing opposite the place has been scattered by bears. Two bags of hard bread found with the clothing, one partly destroyed (also some . . .). I shall now endeavor to examine the English cache, so that we may know what to depend upon; but it is now a dense fog and the ice not very secure, and it is probable I may have to return to my party without the information regarding the latter cache. It is impossible for Lieutenant Greely and party to move with their equipment to this neighborhood until later in the season, and it is my opinion he will go into winter quarters at his present position, and send for the provisions herein mentioned so soon as Rosse's Bay freezes over. I take all records concerning us for Lieutenant Greely's information, as I cannot wait to make copies. Too cold to add further particulars. I start back at once.

GEORGE RICE,

Signal Corps, Lady Franklin Bay Expedition.

October 6, 1883.

THE FIFTH AND LAST PAPER READ.

My party is now permanently encamped on the west side of a small neck of land which connects the wreck-cache cove or bay, and the one to its west. Distant about equally from Cape Sabine and Cocked Hat Island. All well.

Sunday, October 21, 1883.

A. W. GREELY,

Commanding.

THE RETURN OF THE RELIEF SHIPS TO THE UNITED STATES.

At 6 P. M. of the 23d of June the "Thetis" and the "Bear" sailed for Littleton Island, arriving there in three and a half hours. Having deposited a record in a cairn of Sir George Nares for the commander of the "Alert," they started south toward Northumberland Island, encountering for twenty-four miles a field of bergs, heavy pack, and fogs. By midnight of the 25th they were at Cape Parry, where a second cairn was built for the "Alert." Near Wolstenholme Island they met seven of the whalers, and announced the rescue to them. Commander Schley was satisfied that some one of these would have pushed forward and found Greely, but certainly too late. While the ships were together the whalers were very cordial, and their advice was valuable and most gratefully acknowledged. June 27, Conical Rock was again reached, a cairn built for the "Alert," and the course resumed and followed without unusual Arctic experience.

After a necessary delay at St. Johns, to prepare proper caskets for the dead, the ships sailed for Portsmouth, N. H., where a much-needed rest was enjoyed by the officers, as well as by the survivors. Congratulations were abundant during the review of the ships and others in the harbor. August 8, the bodies of the dead were delivered to the care of the commander of the military post on Governor's Island, General Hancock, U. S. A.

The ships needed repairs, and went into the docks at the Brooklyn Navy Yard. The cruise had been one of some seven thousand miles for the "Thetis" and the "Bear;" for the "Alert," six thousand. Both on the outward and on the homeward voyage the two first had been exposed to almost continuous danger. The "Bear" had been pulled off a sunken rock lying fifteen feet under water, and the "Thetis" was much, though not severely, rubbed by her frequent ramming. Moored to an iceberg outside of Upervik when it capsized, she had lost, in bringing up, an anchor and thirty fathoms of chain.

THE OUTLAY.

The total outlay for the relief footed up about seven hundred and fifty thousand dollars, but from this the large value of the vessels and their equipments and remaining stores must be deducted. The "Thetis" and the "Bear" had proved themselves, perhaps, the very best of the Arctic fleets; they may be of essential service on such parts of our coasts as may need new service, not necessarily that of exploration. The prompt, successful rescue must unquestionably be credited to the zealous co-operation of officers and crews of this volunteer expedition with the decisive measures taken by the Secretaries of the Navy and War. It has rarely occurred in naval experience that a ship gets away at or very close to the designated hour, but for this expedition for which so much foresight and so much of care were necessary, delay was neither permitted nor desired by any, from the highest to the lowest in the service. Each of these ships left New York one hour before the appointed time of sailing.

The whole period of the planning and equipment of the expedition, and its outward and return voyage, was but five months from the date of the Joint Resolution passed by Congress, February 13, to the arrival of the ships at St. Johns.

It may safely be affirmed that neither the National Legislature, the Executive, nor the people of the land which sent forth these explorers to the far north, regret the appropriation for their work, or the later one for their relief, which was unhesitatingly made to be unlimited in amount. The saving of even the few lives redeemed, the true value of their work during the long years of absence, and the conduct of the relief, make up a compensation which is increased largely by the exhibition of so much of good feeling on the part not only of their own countrymen, but from governments, institutions, and eminent men abroad.

Impartial history finds its chief regret in the conviction that lives were needlessly sacrificed. Two ships should have been a part of the first expedition; stores should have been left by it on its way up in

1881; the "Neptune" should not have been delayed, and sent forth under one commissioned officer: in a word, an expedition necessarily naval to a large extent, in its ideas, should not have been without naval command.

It must be confessed with the distinguished Arctic traveller, Kennan, that,— "If Lieutenant Greely and his party had all returned in safety to the United States, as they might have done had they been properly supported, their Arctic record, in point of skilful management and success, would have been unparalleled. No other Arctic expedition has ever spent two consecutive winters and part of a third in such high latitudes, and achieved such results without a casualty or a single case of serious sickness. If Lieutenant Greely had found at the mouth of Smith's Sound the shelter and food which he had a right to expect there, he would probably have brought his entire party back to the United States in perfect health after three winters in the highest northern latitudes that have ever been reached, and after a series of sledging campaigns which for boldness and skilful execution have rarely, if ever, been surpassed."

The selection of the site for Greely's party was wise. Discovery Harbor had been occupied by one of the English exploring ships of 1875, and very favorably reported on by its officers, as showing abundance of game and prolific vegetation and verdure in the Arctic summer. The object of the exploration and its localities were not unworthy or unwisely determined, nor were its original supplies of provisions, sanitary appliances, or scientific means. The Signal Service must be credited with full foresight here.

"But grave errors in judgment must be admitted. They were forcibly presented by the 'Proteus' Court of Inquiry, convened Nov. 8, 1883, by order of the Secretary of War, and composed of Generals Benet and Poe, Colonel Ayres, and Major Goodfellow, the last named being one of Kane's companions of 1855. The charges by the Court of "nine errors and omissions" seem sadly confirmed by the history now before us, and despite of all the just commendation of the other labors and results of our Signal Service, these will be again painfully accepted by the unprejudiced readers of the report.

The first error was in not submitting in 1882 plans and estimates to Congress for organizing a relief expedition of two vessels, thus to diminish largely the chances of failure. To this the chief Signal Officer placed the plea in bar that the reluctance of Congress to grant appropriations deterred him from asking the money necessary for two ships. The plea was not admitted. The Signal Service failed to perceive the necessity of sending out even the second relief single ship till May, 1883, leaving no proper time for its full organization; and when sending it ordered only "one commissioned officer." This failure to provide seasonably, at the first departure of Greely, and afterward for the relief ships successively, an organization sufficient to provide for the safety of so perilous an expedition, combined with and resulting from a "persistent unwillingness" to co-operate with or receive assistance from the Navy, was the grave basis of the finding of the Court. It brought about all the loose instruction to Garlington;* it urged him to hasten forward without caching the supplies which would have been so sustaining to the now lost ones."

Yet, as ever, true and lasting good must come out of the evil. Demonstration has been made that even further north than this colony was posted, human life and labor may be safely maintained. America is again in the advance in scientific research. The Coast Survey, with all scientific men, await the pendulum comparisons, always of first import; hydrography and other branches of science await the reduction of continuous observations with the best of instruments, made by these Signal Service observers, and the corrections of the charts for these dangerous coast lines made by the navigating officers of the relief ships. Geographical boundaries are extended; and the lessons of experience, though severely taught, will not be lost by the two branches of our national defence.

* The severity of the season of 1882-83, as ascertained by Commander Schley, abundantly confirms the judgment which did not send out a relief on the return of Garlington.

CHAPTER XV.

ALASKAN EXPLORATIONS.

EXPLORATION UNDER THE WESTERN UNION TELEGRAPH COMPANY. — WORK OF THE UNITED STATES COAST SURVEY IN ALASKA. — LIEUTENANT RAY'S OBSERVATIONS AND EXPLORATIONS. — DECREASE OF MAGNETIC FORCE. — NO POLAR SEA BELIEVED TO EXIST. — RECENT EXPLORATIONS BY LIEUTENANT G. P. STONEY.

ARCTIC exploration on the northwest side of America has no historic record equalling that of the northeast. For the problem of the Pole and the passage to Asia, the expeditions of three centuries, from the days of the Cabots and of old Frobisher, followed by those of the whalers pressing further for new fishing-grounds, opened up seemingly a horizon of expanding wideness for our later voyagers. But navigation, as yet in its comparative infancy, could be expected to furnish the men and the means from Western Europe only; and even down to our own day, American expeditions for the search were of necessity fitted out in our Eastern ports only and without expectation of weathering the stormy Cape. The first United States Expedition for scientific objects, that of 1838, contemplated the South Pacific; it is much to the credit of the late Admiral Rodgers that while the "Vincennes" was only "permitted" to go North as far as the commander might think proper, in a sailing vessel and one not well fitted for the Arctic, he extended his work not only to the Alaskan shores benefited by surveys, but also to the North Pacific, reaching, as we have seen, the high latitude of $72^{\circ} 5'$. (Pages 108-131).*

* Remembering that neither extended geographical nor other scientific research could be expected from the Spanish-American States on the one side, nor from China or Japan on the other, one is prepared to find the first visits to our extreme Northwest, and the determination of the borders of the two continents, made by the country which had the means as well as the nominal rule in Asia to the Pacific shore. The history of these Rus-

EXPLORATION UNDER THE WESTERN UNION TELEGRAPH COMPANY.

The project of an international overland telegraph line to Europe *via* Bering Strait was originally conceived by Perry McD. Collins, Esq., U. S. Consular Agent on the Amoor River. Tripartite and co-operative grants were made by Russia (1863), Great Britain (1864), and by the

sian voyages, and of those made by the English, the French, and others—including even one by the Italians—falls without the province of this volume; but as our own recently-acquired possession in that region bears everywhere upon it the names and traces of its discoverers and former owners, a glance at these visits cannot be without profit for those who will be watching the future of our purchased land.

For the basis of the account here given, full acknowledgment is cordially tendered to Mr. W. H. Dall of the U. S. Coast Survey, as also for the notes of the Coast Survey and preceding explorations by the Western Union Telegraph Company in their effort of 1866-7 to establish an overland line from Asia. In all of these explorations Mr. Dall himself had full share, and his volume, "Alaska and its Resources," is as full and as trustworthy as could be desired.

The earliest Russian Expedition crossing the Pacific appears to have sprung from desires expressed to the Czar Peter, in 1725, by those scientists who longed to learn the true extension of Asia and America—whether the two so-named were separate, and, if so, to what extent. Peter drew the instructions for an expedition with his own hands, and this probably further secured their committal by the Empress, after his almost immediate death, to the hands of Vitus Bering for prompt execution. Bering (as he wrote his own name), a Dane in the service of the Empire, on his first voyage passed the Island St. Lawrence and sailed through the straits, rounding the continent as far as Cape Serdze Kamen; on his second, in 1741, his tempest-tossed vessel was cast upon a desert island, then without a name, where, sheltered from the cold only by the sand of a ditch, he miserably perished. His body, "scraped out of the ground," was buried on this outpost of Asia, which his country did not fail to retain in the demarcation of the line of our recent purchase. The furs and skins brought by the survivors were the source of future expeditions and of the wealthy trade of this day. Of the companies formed for trading purposes, the "Russian American," chartered by Paul, 1799, held its franchise with various modifications down to our own times. It has been succeeded by the Alaska Commercial Company of San Francisco, which received from the United States Government in 1870, by a lease for the period of twenty years, the inheritance of the treasures of the islands of St. Paul and St. George.

In 1778 the illustrious Cook saw and named Mount St. Elias, touched at Unalashka, and traced the northern coast around to "Icy Cape;" and eight years afterward the equally unfortunate La Perouse again was under the shadow of the mountain, and anchored in Lituya Bay. Resulting from these visits were those of the trading vessels from China under the East India Company's flag, and those made under the King George's Sound Company. Portlock and Dixon gave names to the points thus visited.

Passing by the voyages of Vancouver, Krusenstern, and Lutke, and coming down nearer to our own day, the first northwestern trading American association appears under

Congress of the United States in Public Act of July 1, 1864, granting rights of way and authorizing the proper officers of Russia and the United States to detail for surveying and other purposes national vessels for the promotion of the desired object.

the name of the Pacific Fur Company, whose first ship was at Sitka in 1810, but whose operations were transferred to the mouth of the Colombia. The enterprise of Mr. Astor, given to the world by the pen of Irving, is a marked point in the history not only of commerce, but of the settlement of the northwestern boundary.

The later explorations of the "Plover," the "Herald," and the "Investigator" and "Enterprise" of the English Reliefs for Sir John Franklin, added largely to our knowledge of the Northwestern and Northern Ocean as far as "Banks Land;" and this brings us again to our own exploration—that of the "Vincennes," re-examining Captain Kellett's report of the island "Plover," now dropped from the charts. The voyage of the "Vincennes" was largely prompted, however, by the accounts of the successful opening of the whale fishery north of the Straits, an opening made by the "Superior" of Sag Harbor, N. Y., Captain Royce, in 1848, whose venture through was so highly rewarded as to tempt, and with success also, within the three years following, American whalers to the number of three hundred and fifty. The American fishing grounds were permanently established by these visits and by the surveys begun by Rodgers and continued to this day.

Among the checks to the prosperity of the now-decayed interests of the whaler will not be forgotten the fearful losses by capture during the war of the rebellion, and, in this connection, the "inhuman devices" resorted to by the privateers. See the history of the "Shenandoah," Commander Waddell, especially—Report of U. S. Fish Commission, 1875, pp. 102, 103.

The chief authorities on our Alaskan Territory and on American Explorations there are:—

"Travels and Adventures in Alaska." F. Whymper. 1869.

"Alaska and its Resources." W. H. Dall. 1870.

Message of the President U. S., with accompanying papers, Ex. Doc. No. 177, 40th Cong. 2d Sess. 1868, p. 361. It contains Sumner's speech, Secretary McCullough's Report, and Professor Davidson's to U. S. Coast Survey.

Message of the President, 40th Cong. 3d Session, Senate Ex. Doc. No. 42, 1869; Senate Ex. Doc. No. 12. Ho. Reps. Ex. Docs. Nos. 35 and 43. 44th Cong. 1st Session (Lieut. Maynard's Rep.), 1876; Ho. Reps. Ex. Docs. No. 83. 44th Cong. 1st Session, 1876, and Report No. 623.

Report on the Condition of Affairs in Alaska. W. H. Elliott, Special Agent of Treasury Department. 1875.

Senate Ex. Doc. No. 59, 45th Cong. 3d Session. (Report of W. G. Morris, Special Agent of Treasury Department. 1879.) Senate Ex. Doc. 132, 46th Cong. 2d Session.

Ho. Reps. Ex. Doc. No. 40, 46th Cong. 3d Session, Report by Ivan Petroff. Full Report of same, with Illustrations by same. Vol. 8 of U. S. Census, 1880, 4to. pp. 190. Senate Ex. Doc. No. 71, 47th Cong., 1st Session. Ho. Reps. Ex. Doc. No. 9, 47th Cong., 2d Session.

See also Smithsonian Reports "Arctic Exploration," and Starbuck's and Sandford's History of American Whale Fisheries in Reports of U. S. Fish Commission, 1875 and

In pursuance of this act, the revenue steamer "Shubrick," Captain Charles M. Scammon, was detailed by the Secretary of the Treasury Feb. 13, 1865, and the screw corvette "Variag" by the Russian government in November of the same year. Subsequently Messrs. S. Abasa and N. Anossoff, specially commissioned officers of Russia, were detailed for duty in connection with the Expedition, and, on the part of the United States, Captain C. M. Scammon, Lieutenant J. Davison, and Lieutenant Russell Glover of the U. S. Revenue Marine.

The commander of the Expedition was Captain Charles S. Bulkley, late of the U. S. Military Telegraph Corps, with a full corps of assistants, including Robert Kennicott, in charge of the American explorations in the Alaskan regions, with Messrs. W. H. Dall, J. T. Rothrock, H. M. Bannister, H. W. Elliott, and others, as a scientific corps; Fred. Whympfer, artist; Messrs. George Kennan, R. J. Bush, and others, under the direction of Mr. Abasa, in charge of the Siberian explorations. The results of this Expedition may be summarized as follows: The identity of the Yukon of the interior with the Kwichpak of the coast was determined, and course of the Yukon, eighteen hundred miles, from the sea to Fort Selkirk, was traversed for the first time by Messrs. Ketchum and Lebarge, after an adventurous journey of five hundred miles with dogs and sledges over the ice, through an unknown and uninhabited country. The region between the great bend of the Yukon and Norton Bay was first explored and mapped by Dyer and Cotler, and the Kaviak Peninsula of Siberia by Baron de Bendeleben, Kennan, Bush, and others. Penkegu Gulf, the estuary of the Anadyr River, the rivers of Norton Sound, and the interior of British Columbia at the Babine lakes were, for the first time, mapped and surveyed. Smith and Dyer surveyed the Yukon delta; Dall and Whympfer the river from the Arctic circle to Nulato; Kennan, Bush, and others the Anadyr River and the coasts of the Okhotsk Sea.

1884, and Monograph of the Seal Islands and Statistics of Fisheries, Census Report, 1880; Charts of U. S. Hydrographic Office, the Alaska Coast Pilot of U. S. Coast and Geodetic Survey and Map of Alaska, 1883.

Reports to the Revenue Marine, Treasury Department: Alaska and its People, Capt. G. W. Bailey, 1880; First Cruise of the "Corwin" in the Arctic, Capt. C. L. Hooper; Second Cruise of the "Corwin," Part I. Scientific Notes, Part II. Narrative, 1881.

No report of this Expedition has ever been published. Its maps and records are widely scattered, and a large number of scientific papers have been based on the material gathered.

In addition to our knowledge of Arctic geography and the fauna of both shores enlarged by its labors, its explorations undoubtedly forwarded, in a great measure, our acquisition of Alaska and its subsequent development. The enterprise, in itself an experiment, thwarted by the nature of the country and by the obstacles arising out of its partly uninhabited condition and partly savage occupancy, was pushed into the field in 1865, enlarged in 1866, and withdrawn on the successful completion of the Atlantic cable. Its first chief, Mr. Robert Kennicott, a former explorer of the Yukon in the service of the Hudson Bay Company, was unfortunately found dead on the banks of the river; an open compass lying near him, and figures in the sand showing that at the moment of death he was making a calculation. A sufferer from heart disease, he had, the day previous, subjected himself to much exposure while saving the life of a Russian whose canoe had been caught in the ice. His remains were borne five hundred and eighty miles, by Lieutenant Pease and Smith, Adams, and Dyer, by river and sea, to Fort St. Michael. Mr. Dall succeeded to the command and the return of the Expedition, 1867.

WORK OF THE UNITED STATES COAST SURVEY IN ALASKA.

Notes of this also have been kindly furnished by Mr. W. H. Dall, as follows:—

I. A geographical reconnoissance by Assistant George Davidson was undertaken in 1867, occupying the months of August to November of that year. The party, including Mr. A. T. Mosman of the Survey, Mr. Theo. Blake, geologist, Mr. W. W. Harford, naturalist, and Dr. A. Kellogg, botanist, and others, were accommodated on the revenue-cutter "Lincoln," Captain W. A. Howard, U. S. R. M., and their opportunities were subordinate to the revenue duties of the vessel. The astronomical position of Sitka, St. Paul, Kayak Island, and Qlinlink, Unalashka Island, were determined for the first time with accuracy, numerous preliminary surveys made, extensive fishing-banks discovered, and the

volcano of Makushin at Unalashka was ascended and measured. A multitude of details bearing on the navigation of the territory were obtained. The report was published in the Coast Survey Report for 1867, and with other material formed the basis of the "Coast Pilot of Alaska," first published by the Survey in 1869, and the atlas of the Harbor Charts of Alaska issued during the same year. Tidal and meteorological stations were established in the Territory of Alaska at Sitka and Unalashka.

II. In 1869 the Coast Survey sent a party to observe the solar eclipse of that year at a station on the Chilkat River, Alaska, during which journey, performed under many difficulties, Assistant George Davidson determined the position of Fort Wrangell and several other localities, including the eclipse station Kohklux, on the Chilkat River, obtaining much new geographical information and the material for several charts.

III. In July, 1871, the Survey determining on consecutive reconnaissance work in Alaska, the schooner "Humboldt" was fitted out, and sailed, in charge of Assistant W. H. Dall, for the Aleutian Islands, reaching the harbor of Unalashka in September, the following year, prosecuting geographical work along the line of the islands from Unalashka to Kadiak, and returning to San Francisco in September, 1872. The result of this work was especially the preparation of numerous new charts, including a reconnaissance of the Shumagin Islands and many harbors used by the fishing fleets, the study of the currents, tides, and meteorology, and the ascent and measurement of many mountains near the coast. A number of geographical positions were astronomically determined, and the survey of Captain's Bay, Unalashka, begun.

IV. The "Humboldt" proving unsatisfactory for dangerous work of surveying an almost unknown coast, the schooner "Yukon," in April, 1873, proceeded to Unalashka under the command of Assistant Dall, with Mr. Marcus Baker as astronomical observer. The year was spent in researches in the Aleutian chain, west of Unalashka, where a number of harbors were surveyed (one for the landing of the projected Pacific telegraph cable), and important magnetic and hydrographic observations made, from which a new chart of the Aleutian Islands was afterwards constructed.



ARCTIC OCEAN



SECTION OF MAP OF EXPLORATIONS

IN

NORTH WESTERN ALASKA.

UNDER THE DIRECTION OF

W.B. HAZEN,

Brig and Bvt. Maj. Genl. Chief Signal Officer, U.S. Army

BY

F.H. RAY,

1st Lieut. 8th Infantry, U.S. Army,
Commanding Expedition to Ft. Barrow, Alaska,
1881-1883.

V. In 1874 the "Yukon" proceeded on an extensive cruise, beginning at Sitka and continuing along the coast north and west, making a reconnoissance of the St. Elias Alpine region, determining the height and position of Mount St. Elias and several other extremely high peaks. Numerous harbors were visited, charts made, and astronomical and magnetic observations procured on the Pacific coast of Alaska, after which the "Yukon" sailed northward, mapping the Pribiloff or Fur-seal Islands, and proceeding northward of lat. 60° , surveying harbors on the north side of Nunivak Island and of the Alaska Peninsula. The work this season included an enormous number of hydrographic and magnetic details of great value for improving the charts.

VI. In 1880, Assistant Dall again took the field with the "Yukon," obtaining results at forty-two stations between April and November. The magnetic work being deemed particularly important, the chain of stations was carried far north of previous work by the Survey, into the Arctic Ocean within a few miles of Point Barrow, where navigation was interrupted by the ice. Stations were occupied on the eastern coast of Siberia at Plover Bay, and on the American coast at Port Clarence, Cape Lisburne, Chamisso Island, Icy Cape, Point Day, and Point Belcher. It was shown that the magnetic variation had greatly changed since previous explorations, and that marked on the best charts in use was seriously and dangerously in error. On the return, the rocky and inaccessible island of St. Mathew was visited, and the Seal Islands, Unalashka, and the harbor of Chernoffski; at all of which important geographical rectifications were made. The ice-cliffs of Kotzebue Sound were visited and studied.

VII In 1881, 1882, and 1883 the Coast Survey steamer "Hassler" was employed in hydrographic and magnetic work in Southeastern Alaska, in the command of Lieutenant H. E. Nichols, U. S. N. This work included the beginning of a complete reconnoissance of the Alexander Archipelago. The important channels of navigation from British Columbia toward Sitka were investigated. The charts will form the first of a consecutive series of sailing-charts of Alaska, such as the British Admiralty has prepared for much of British Columbia, and which will be of great value to navigation. Numerous single harbors were surveyed,

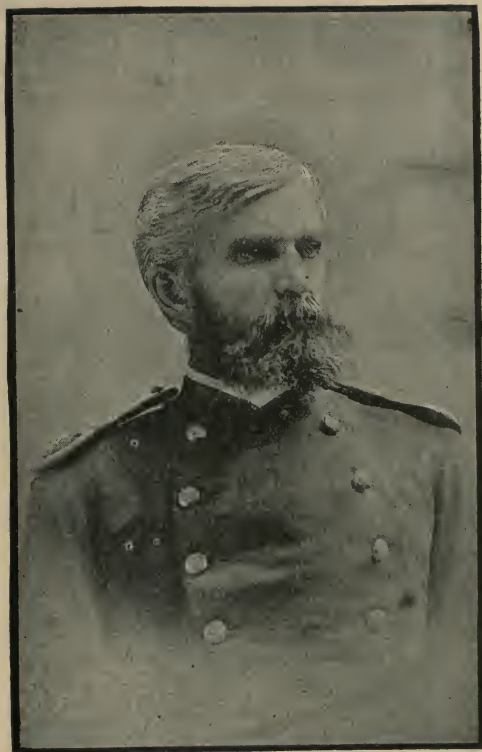
and a multitude of notes for the Coast Pilot collected, beside important collections of natural history. Lieutenant Nichols, now commanding the U. S. steamship "Pinta," is again surveying in this vicinity under orders of the Secretary of the Navy.

LIEUTENANT RAY'S OBSERVATIONS AND EXPLORATIONS.

Reference has already been made (pp. 531, 552-558) to the establishment by the United States Signal Service of a station at Ooglamie, Alaska, as one of those recommended by the International Polar Commission, 1881, to the first report from Lieutenant Ray, its chief, and to that of Lieutenant Powell, 1882. Appendix No. 13 of the Report of the U. S. Coast and Geodetic Survey for 1883, now issued, embraces the results of the magnetic observations made at the station, 1881-1883, reduced and discussed by Mr. Charles A. Schott. In this report will be found the account of the instrumental outfit, the disposition and adjustment of the instruments, directions for observing, and general account of the magnetic work; as well as of the circumstances controlling the precise character of the work in relation to the rigid instructions for the Expedition. The Records and Results are "the outcome of faithful labor, and are believed to be an acceptable contribution to our knowledge of magnetism in high latitudes." The geographical position of Ooglamie, as derived by Lieut. Ray from dead reckoning on the "Golden Fleece," is lat. $71^{\circ} 17' 5''$, long. $156^{\circ} 23' 45''$ W.; the determinations adopted by Mr. Schott from the astronomical observations of Mr. Dark and the chronometric by Lieutenant Powell give the positions of lat. $71^{\circ} 7' 7''$, long. $156^{\circ} 39' 45''$.

DECREASE OF MAGNETIC FORCE.

"Observations at Washington, D. C.; at Toronto, Canada; at Madison, Wis.; at Esquimaux, British Columbia; at Sitka, Alaska, and at many intermediate places (see Preface to 'Diary of a Magnetic Survey of a portion of the Dominion of Canada,' by General Sir J. H. Lefroy, London, 1883), show that the dip, as well as the total intensity of the magnetic force, are at the present time, and have been for some years past, slowly *decreasing*; the result at Ooglamie



LIEUTENANT P. H. RAY,
8th Infantry, U. S. Army, commanding Expedition to Point Barrow, Alaska, 1881-1883.

is conformable with this general and extended action of the secular change."

"Exploring work," says Lieutenant Ray, "was made secondary to that of meteorology and magnetism." In 1883 Lieutenant Ray entered the hitherto unknown region between the Yukon and the Arctic Sea. He says:—

"Accompanied by two natives, I travelled one hundred and sixty miles due south from Point Barrow, striking Meade River sixty miles above its mouth, and following up its course until in sight of a low range of mountains, trending northwest and southeast, and dividing the northeast water-shed from that of Kotzebue Sound: here my native guides refused to go further; they had not themselves been so far into the unknown, which to them is peopled with imaginary enemies. I found the country lying along the coast level, about one hundred miles back, slightly undulating, the low divides trending northeast and southwest, and the whole region a labyrinth of small lakes, lagoons, and streams, and in summer impassable to any one but a native with his kyak, as all that part which is not covered with water becomes like a wet marsh when thawed by the summer sun, into which the traveller sinks down to the frozen earth at every step. This region is inhabited, and only visited by a few natives from Noonook and Ooglamie in the winter in the pursuit of reindeer along the Meade River; but saw several ruins of winter huts very old, and the natives have a legend that this region was once inhabited, but they all perished from famine. All streams of this northern water-shed have broad, shallow channels, owing to the fact that the earth is perpetually frozen, and the summer traveller who sees them full of waters from the melting snow is apt to go away with the impression that they are large rivers; but they soon run down when the frost seals up their sources, and in the winter they freeze solid on the bars and riffles, and cease to flow. The region is destitute of timber; a few Arctic willows and a coarse salt grass; otherwise, a dense growth of moss affording pasturage to a few reindeer. There is no soil to support vegetation, and the earth was found to be strongly impregnated with salt to the depth excavated, — thirty-eight feet.

NO POLAR SEA BELIEVED TO EXIST.

"After two years' careful investigation, I am well satisfied that there is no open Polar Sea, from the facts that the temperature of the sea-water is unvarying from the time the sea closes in October until it opens in July, which could not well be the case if there were a large body of warm water lying around the Pole, and that the atmospheric conditions are found to be such as would not exist near a large body of water; for in the winter, clouds are rarely seen, except to the south and the west, and there is no precipitation except the frozen mist that drifts in from the ocean, which is simply the condensed vapor rising from the cracks opened by the gales and the tides. The constant crowding of ancient ice, so often noticed by explorers, I think, can be

fully explained. The maximum thickness of the ice formed over still water on sea or inlet was seven feet. The Arctic Ocean is filled with pack varying from seven to one hundred feet in thickness; its rough, broken surface being acted upon by violent gales during the winter, opens cracks of all dimensions, from a few feet to a mile in width; these freeze over with great rapidity, as the water stands at 29° F.; and this expansion forces apart the great masses; and as the depth to which the land will freeze is limited to six and a half or seven feet we have the phenomenon of heavy ice replaced by light. This process is going on every day and hour, and the old ice must yield towards the side of the least resistance, which is the lower latitude." — *Lieutenant Ray, at the Meeting of the British Association, Montreal, September 2, 1884,*

RECENT EXPLORATIONS BY LIEUTENANT G. P. STONEY, U. S. N.

It may be remembered that Lieutenant Stoney was sent out by the Navy Department (see page 484) to distribute rewards to the Tchuk-tchis of St. Lawrence Bay for their hospitality to the sufferers at the burning of the "Rodgers." The congressional appropriation of \$3,000 was expended in the purchase of a large variety of goods adapted to native wants, including provisions, ammunition, clothing, and the smaller articles courted by the native women, with a plentiful supply of tobacco for the men. Every one who had rendered help received something valuable, the Lieutenant himself handing over each article, in the belief, he says, "that the effect would be better, since I was one of the unfortunate." "The supply was most seasonable; never did presents come at a more fortunate time, as their walrus catch last winter was very small, and they had no ivory for exchanges. They were made happy, and the results will be most excellent. I would not mind a shipwreck again there."

On the completion of this duty, in July, 1883, Stoney found it necessary to await the reappearance of the revenue-cutter "Corwin" in Hotham Inlet for his homeward voyage. Hearing from the natives of a mighty river toward the northward and the westward, "larger than the Yukon and emptying into the Inlet," — in the dingy which the "Corwin" had left for him, in company with one white man, an interpreter, and a native who claimed to live hundreds of miles up the river, he set out to ascertain what he could within the limited period of his time. After some vexatious delays of misleading by his first guide, Stoney found what he believed the new and previously undiscovered river; he

sounded in it across a width of three fourths of a mile, finding nowhere less than three fathoms, and in mid-stream five; the current from two to two and a half knots in the middle, decreasing in some places near the banks to an eddy. Ascending further, he passed several villages, at each of which he left tobacco liberally for the absent men, the women showing much fright. On his return the tobacco had insured not only safety, but a pleasant welcome.

Encouraged by his trip, and in the belief that he could push his discoveries further, under orders of the Navy Department, April 13, 1884, he left San Francisco for Hotham Inlet in the United States schooner "Unalashka," and after a rough passage, in which the vessel proved seaworthy, arrived at Unalashka May 20, from which port he surveyed the volcanic island, new Bagaslov, thrown up in October previous. May 27 he saw the smoke of a volcano bearing west by south (true); it extended from the volcano to the island of Unalashka, a distance of forty-five miles. The volcano is a remarkable feature of this island. At first sight it resembles an immense lime-kiln, presenting the interesting appearances of fitful emissions of dense black and white smoke, the crater being at times entirely enveloped, and again its jagged edges plainly visible. "Where the vessel anchored, repeated shocks of earthquake were felt; no traces of lava or of shells, though carefully looked for; sand only, with cinders; and in the crevices of the volcano sides, whose inclination was from 40° to 75° , were deposits of sulphur and white crystal substance. On shore marked local effects on the compass were experienced, showing the presence of iron."

While sounding near the Nunivak Islands, specimens from the bottom were dredged like those which the codfish frequent, and the fish were found very numerous and of excellent quality, weighing from thirteen to seventeen pounds. The grounds extend from lat. $60^{\circ} 22'$ N. and long. $168^{\circ} 45'$ W. to Nunivak Island. The longitude of the West Cape of this island was found to be ten miles too far to the eastward on the charts.

July 10, arriving at Hotham Inlet, he found there the revenue-steamer "Corwin." After a three days' struggle of sailing, drifting, and poling, the schooner was brought into a clear channel between the pack-ice

and the shore, and entered the mouth of a river, which Stoney named after the lost Putnam of the "Rodgers." In the steam launch, with three white men, an interpreter, and two Indians, followed by the dingy and a native skin-boat, Stoney followed the "Corwin" up stream. Passing her launch two hundred miles up the river, he continued still farther two hundred miles, when the lateness of the season compelled his return. At a distance of three hundred miles up, his launch had been left at the strong rapids, while he made the further distance in a native skin-boat. Learning from the natives that the river flowed through four lakes, he crossed one of them in a canoe, and, climbing a mountain on the other side, saw clear indications of the river stretching to the northward and east as far as the eye could reach.

Lieutenant Stoney considers the discovery of the codfish grounds an important result; the reports off the Nunivak Islands had been that they were few in number. He brought back specimens of coal and other minerals.

These notes of American Explorations on the Northwest Coast might be largely extended, to include the details of the several Expeditions, and the prospects of the region recently organized under territorial government. The proper administration of this, the continuance of the cruises of the naval vessels carrying forward the work of "the Coast Survey," and those of the Revenue Marine, will steadily advance our knowledge of the Alaskan waters, of the Straits, and the Icy Sea. The statements of the first pages of this volume, that Arctic Exploration will not soon be abandoned, are confirmed. The problem of the pole will be further investigated, for human curiosity will not otherwise be satisfied; but the more profitable explorations will be those which tend toward the development of lands offering inducements to the miner, the whaler, and the fishermen. While these closing words are on the press, Congress has called for the report by Lieutenant Schwatka of his recent journey up the Yukon. The explorer confirms all that has been said of the great river, and represents with much interest the opening future of Alaska in the development of its whale, salmon, and seal fishing; its immense codbanks; its grazing lands on the west; and its timber lands on the east coast.

APPENDIX.

BIBLIOGRAPHICAL INDEX TO THE CHIEF PUBLICATIONS ON POLAR EXPLORATIONS, FROM THE DATE OF THE REVIVAL OF ARCTIC EXPLORATION.*

1818. Chronological History of Voyages into the Arctic Regions. Sir John Barrow.
1819. Journal of a Voyage to the Arctic Regions in 1819. A. Fisher.
 " Voyage for Inquiring into the Probability of a Northwest Passage, Baffin's Bay,
 and Davis Strait. Captain Sir John Ross.
1820. Account of the Arctic Regions, etc., Greenland and Spitzbergen. W. Scoresby.
1821. A Journal of a Voyage of "Hecla" and "Griper" to the Arctic Regions in
 1819-20; Parry Islands. A. Fisher.
1821. Journal of a Voyage for the Discovery of a Northwest Passage, etc.; Parry's
 Islands. W. E. Parry.
1823. Journal of a Voyage to the Northern Whale Fishery, Including Researches on the
 East Coast of Greenland. W. Scoresby.
 " Narrative of a Journey to the Shores of the Polar Sea in 1819-22, etc. Sir J.
 Franklin.
1824. Private Journal During Captain Parry's Second Voyage; Parry's Islands. Lyon.
 " Narrative of a Pedestrian Journey to the Frozen Sea, etc. J. D. Cochrane.
 " Journal of a Second Voyage for the Discovery of a Northwest Passage, 1821-23,
 etc.; Parry Islands. Sir W. E. Parry.
1825. Account of Experiments to Determine the Figure of the Earth. Also a Brief Ac-
 count of Captain Clavering's Voyage to the Arctic Regions. Major-General
 E. Sabine.
 " Brief Narrative, Repulse Bay, etc., Hudson Strait. Captain Lyon, R. N.
1826. Journal of a Third Voyage for the Discovery of a Northwest Passage, 1824-25,
 etc.; Parry Islands. Sir W. E. Parry.
1828. Narrative of an Attempt to Reach the North Pole in 1827; Spitzbergen. Sir W. E.
 Parry.
 " Second Expedition to the Shores of North America. Franklin and Richardson.
1832. Undersögelses-Reise til Ostkysten of Grönland, etc.; East Greenland. W. A.
 Graah.
1834. Arctic Expeditions from England from 1497-1833. Anonymous.
 " The Position of the North Magnetic Pole. Sir J. C. Ross.
1835. The Last Voyage of Captain J. C. Ross to the Arctic Regions, etc. R. Huish.
 " Supplement to Sir James Ross's Second Voyage in Search of a Northwest Passage,
 Boothia Felix, etc.; Parry Islands. S. Braithwaite.

* The list here given, taken chiefly from the Manual prepared for the English expedition of 1875, and continued to the present date, presents the order of publication rather than that of the voyages narrated.

1835. Narrative of a Residence in the Arctic Regions 1829-33. Captain Sir J. Ross.
 " The Last Voyage of Captain Sir J. Ross for the Discovery of a Northwest Passage. R. Huish.
 " Narrative of a Second Voyage in Search of a Northwest Passage. Captain Sir J. Ross.
 " Sur les Découvertes Faites en Grönland, etc. M. de la Roquette.
1836. Narrative of a Journey to the Arctic Ocean in 1833-35, etc. R. King.
 " Narrative of the Arctic Land Expedition to the Great Fish River, etc. Sir G. Back.
1837. Narrative of an Expedition to the East Coast of Greenland, etc.; Translation by MacDougal. W. A. Graah.
1838. Narrative of an Expedition to the Arctic Shores, etc. Sir Geo. Back.
- 1838-40. Voyage en Grönland pendant 1835 et 1836, etc.; South Greenland and Iceland. P. Gaimard.
1839. Reise auf dem Eismere in 1820-24, etc.; Asia. F. von Wrangell.
 " Sur la Fréquence des Orages dans les Régions Arctiques. K. E. von Baer.
 " Retour en France de la Recherche; Rapport sur la Seconde Campagne au Spitzberg. Captain Favre.
- 1840 and 1841. Narrative of an Expedition to the Polar Sea in 1820-23; Siberia. F. von Wrangell. Edited by Major E. Sabine, R. A.
1843. Voyage towards the North Pole in 1818, etc.; Spitzbergen. F. W. Beechey.
1845. Americas Arctiske Landes gamle Geographie, etc. C. C. Rafn.
1846. Voyages within the Arctic Regions from 1818, etc. Sir J. Barrow.
1847. Aperçu de l'Ancienne Géographie des Régions Arctiques de l'Amérique.
- 1848-56. Arctic Expeditions. A Collection of Papers Relative to the Recent Arctic Expeditions, etc.
1850. Arctic Expeditions. Eskimos and English Vocabulary.
 " Eskimo and English Vocabulary. J. Washington.
 " Arctic Voyage to Baffin's Bay, Baffin's Bay, and Lancaster Sound. R. A. Goodsir.
 " Narrative of an Expedition to the Shores of the Arctic Sea in 1846-47. North America and Southern parts of Parry's Island. J. Rae.
 " The Arctic Expedition of 1849, etc. H. Kellett and others.
 " The Franklin Expedition; or, Considerations for the Discovery of our Countrymen in the Arctic Region. W. Scoresby.
 " Narrative of Arctic Discovery from the Earliest Period. J. J. Shillinglaw.
1851. Arctic Searching Expeditions of 1850-51, etc.
 " Illustrated Geography and Hydrography, Wellington Channel Section. J. Mangles.
 " Arctic Searching Expedition of 1850-51, etc.
 " Voyage of the "Prince Albert" in Search of Sir J. Franklin, etc.; Baffin's Bay and Parry Islands. W. P. Snow.
1852. Om den Geographiske Beskaffenhed af de Danske. Handels-distrikter: Nordgrönland, etc.; Greenland. H. Rink.
- 1852-57. Grönland Geographisk og Statistisk Beskrevet. H. Rink.
1852. Stray Leaves from an Arctic Journal; Baffin's Bay and Parry Islands. Osborn.
 " Remarks on the English Maps of Arctic Discovery in 1850-51. Peter Force.
 " Additional Papers Relative to the Arctic Expedition (in Search of Franklin) under Captain Austin. Parliamentary Paper.
 " Further Correspondence Connected with the Arctic Expedition, etc., in Search of Franklin. Parliamentary Paper.
 " Report of the Committee to Inquire into the Report on the Recent Arctic Expeditions in Search of Franklin. Parliamentary Paper.
 " The Search for Franklin. A suggestion, etc. A. Petermann.

1852. Journal of a Voyage in 1850-51; Davis Strait, Baffin's Bay, and Franklin Archipelago. P. C. Sutherland.
1853. Across to an Open Polar Sea, etc. E. K. Kane.
 " Greenland Eskimo Vocabulary, etc.
 " Franklin's Footsteps; a Sketch of Greenland, etc. C. R. Markham.
 " Second Voyage of the "Prince Albert"; South Part of Parry Islands. Kennedy.
 " Ten Months among the Tuski, with an Arctic Boat Expedition, etc. W. H. Hooper.
 " A Summer Search for Sir J. Franklin, etc., in the "Isabel," in 1852; Davis Strait and Baffin's Bay. E. A. Inglefield.
 " The United States Grinnell Expedition, in Search of Sir J. Franklin, etc.; Southeast Parry Islands. E. K. Kane.
 " Narrative of Three Cruises to the Arctic Regions. B. Seeman.
1854. Journal d'un Voyage aux Mers Polaires, etc. J. R. Bellot.
 " Papers Relative to the Recent Arctic Expeditions in Search of Sir John Franklin, etc.
 " Narrative of a Boat Expedition up the Wellington Channel in 1852, etc. R. McCormick.
 " Arctiske Strömning. C. Irminger.
1855. Last of the Arctic Voyages; a Narrative of the Expeditions of Her Majesty's Ship "Assistance" in Search of Sir J. Franklin, in 1852-54. Sir E. Belcher.
 " Coup-d'œil d'Ensemble sur les Differentes Expéditions Arctiques, etc. V. A. Malte Brun.
 " Voyage in the Arctic Regions. F. Mayne.
1856. Observations Meteorologicæ per Annos 1832-54 in Grœnlandiâ Factæ. C. C. Ostergaarde and others.
 " Arctic Explorations. The Second Grinnell Expedition, etc.; Smith Sound, etc. E. K. Kane.
 " A Short Narrative of the Second Voyage of the "Prince Albert" in Search of Sir J. Franklin. W. Kennedy.
 " Voyages and Travels in the Arctic Regions. Copy of a Letter, etc. J. Rae.
 " Discovery of the Northwest Passage, 1850-54. R. C. M. McClure.
 " On the Open Water at the Great Polar Basin. R. White.
 " Discovery of the Northwest Passage by the "Investigator," etc.; Southern Part of Parry Island. S. Osborn.
1857. Letters from High Latitudes, being an Account of Iceland, Spitzbergen, etc. Lord Dufferin.
 " The Voyage of Her Majesty's "Resolute" to the Arctic Regions, 1852-54; Parry Islands. G. F. McDougall.
 " Discovery of the Northwest Passage. McClure.
 " Erindringer fra Polarlandene, 1850-55, etc. C. Petersen.
 " Personal Narrative of the Discovery of the Northwest Passage. Armstrong.
 " Arctic Explorations and Discoveries during the Nineteenth Century. S. M. Smucker.
1858. The Northwest Passage, etc.; Southeast Part of Parry Islands. J. Brown.
1859. The Voyage of the "Fox" in the Arctic Seas, etc.; Southeast Part of Parry Islands. F. L. McClintock.
- 1859-61. Polar Regions. Sir J. Richardson.
1860. Astronomical Observations made on the Northwest Coast of Greenland, etc. E. K. Kane.
 " Tidal Observations in the Arctic Seas, etc. E. K. Kane.
 " Explorations, Arctiques, etc. P. Chaix.

1860. Arctic Boat Journey in 1854, etc. I. I. Hayes. Boston.
 " The Career, Last Voyage, and Fate of Sir J. Franklin. S. Osborn.
 " On the Lost Polar Expedition, etc. W. P. Snow.
 " A Sequel to the Northwest Passage. J. Brown.
1861. Seasons with the Sea-horses; Spitzbergen. J. Lamont.
 " Physical Geography of the Sea. Lieutenant Maury. Enlarged Edition. London and New York.
1863. Notice sur les Pêches du Groenland. C. Irminger.
 " Geografiska Ortobestämningar på Spetsbergen af Professor A. E. Nordenskiöld, etc. D. C. Lindhagen.
 " Geografisk och Geognostisk Beskrifning öfver Nordöstra Delarne af Spetsbergen, A. E. Nordenskiöld.
1864. Renseignements sur les Premiers Habitants de la Côte Occidentale du Gröenland, etc. C. C. Rafn.
 " Life with the Eskimos, etc., Frobisher Bay and Davis Strait. C. F. Hall.
1867. The Open Polar Sea, etc.; Smith's Sound. Dr. J. J. Hayes.
 " Ueber die Polarländer. O. Heer.
 " Grönland und die Grönländer, etc. H. Helms.
 " The Three Voyages of Martin Frobisher; by Rear Admiral R. Collinson. London. (Hakluyt Series.)
1869. Fate of Sir J. Franklin. The Voyage of the "Fox" in the Arctic Seas, etc.; Parry Islands. Sir F. L. McClintock.
 " The Polar World. Dr. G. Hartwig. 8vo. Harper Brothers, New York.
1871. Land of Desolation; South Greenland. Dr. Hayes.
1873. The Threshold of the Unknown Regions. Notices of Arctic Discovery; East Coast of Greenland, etc. Clements R. Markham.
 " Gateway to the Polynia; Spitzbergen. J. C. Wells. London.
1874. Whaling Cruise to Baffin's Bay, and Rescue of the Crew of the "Polaris"; Baffin's Bay and Southeast Parry Islands. H. A. Markham.
 " Die Zweite Deutsche Nordpolarfahrt. The German Arctic Expedition of 1869-70, under Koldewey; and Translation by H. Bates.
 " The German Arctic Expedition of 1869-70; the Hansa. Captain Koldewey. Edited by H. W. Bates, Assistant Secretary Royal Geographical Society, London.
 " A Whaling Cruise to Baffin's Bay and the Gulf of Boothia. A. H. Markham, London.
1875. A Selection of Papers on Arctic Geography and Ethnology, Reprinted and Presented to the Arctic Expedition of 1875. London.
 " Instructions for the use of the Scientific Expedition to the Arctic Regions. London.
 " The Arctic Navy List, or A Century of Arctic and Antarctic Officers, 1773-1873. C. R. Markham, F. R. S.
 " Remarks on Davis Strait, Baffin's Bay, Smith's Sound. Compiled from Various Authorities.
 " Tales and Traditions of the Eskimos, with a Sketch of their Habits, Religion, Language, and other Peculiarities, by Dr. Henry Rink. Edited by Dr. Robert Brown, London.
 " Report to United States Treasury Department on the Condition of Affairs in the Territory of Alaska. H. W. Elliott.
1876. Narrative of the North Polar Expedition. United States' Ship "Polaris," Captain Chas. F. Hall, Commander; by Rear-Admiral C. H. Davis, United States Navy. Imperial 8vo. Published by the Navy Department; edition exhausted.
 " Two Voyages of the "Pandora," in 1875 and 1876, by Sir Allen Young, R. N. R.
 " Yachting in the Arctic Seas. J. Lamont, F. R. G. S.

1876. Under the Northern Lights. The Cruise of the "Pandora"; by J. A. McGahan, London.
- " Memoirs of Hans Hendrick, the Arctic Traveller. Written by himself. 1853-1876. Translated by Dr. Rink.
1877. Danish Greenland. Dr. Henry Rink. Edited by Dr. R. Brown, London.
- " New Lands Within the Arctic Circle. The Voyage of the "Tegethoff." 1872-74. Julius Payer. 2 vols. 8vo. D. Appleton, New York.
- " Arctic Expeditions from British and Foreign Shores, from the Earliest Times to the Expeditions of 1875-76; by D. Murray Smith, F. R. G. S. 4to. Edinburgh.
- " The Dutch in the Arctic Seas. Samuel R. Van Campen, London.
1878. The English Arctic Expedition of 1875. Captain Nares. (Parliamentary Paper, C. 2176.)
- " Voyage to the Open Polar Sea. Captain Sir Geo. Nares, R. N. 2 vols., 8vo.
- " The Shores of the Polar Sea; a Narrative of the Arctic Expedition 1875-1876. Dr. E. L. Moss, Her Majesty's Ship "Alert." Imperial folio, London.
- " The Great Frozen Sea; the Voyage of the "Alert." Captain A. H. Markham, R. N.
1879. The Two Voyages of the "Pandora," in 1875 and 1876. Sir Allen Young.
- " Narrative of the Second Arctic Expedition made by Chas. F. Hall. Professor J. E. Nourse, U. S. N. Published by United States Senate; edition exhausted.
- " Arctic Experiences of Captain Geo. E. Tyson; the "Polaris." Edited by E. V. Blake. Harper Brothers, New York.
- " The Cruise of the "Florence." Bulletin of the United States' National Museum; by Ludwig Kümlien.
- " Report upon the Customs District, Public Service, and Resources of Alaska; by W. G. Morris. 8vo. Washington.
- " The Arctic Voyages of Adolf Erik Nordenskiöld. Illustrated. 1858-79. McMillan & Co.
1880. Report on Alaska and its People. Captain G. W. Bailey, of the Revenue Cutter "Rush."
1881. A Polar Reconnoissance; being the Voyage of the "Isbjörn" to Novaya Zembla, in 1879. A. H. Markham, F. R. G. S.
- " The Voyage of the "Vega" round Asia and Europe. A. E. Nordenskiöld. Translated by A. Leslie. 2 vols., 8vo. London.
- " Reports of the Cruises of the United States Revenue Steamer "Corwin," 1880 and 1881, in the Arctic Ocean. Hooper, Muir, Nelson & Rosse.
1882. Reports of Captain L. A. Beardslee, U. S. N. : Operations of the "Jamestown" in the Waters of Alaska.
- " Alaska; by Sheldon Jackson, D. D.
- " Report of Affairs in Alaska; by L. A. Beardslee. 8vo. Washington.
- " Nordenskiöld's Voyage round Asia and Europe; the "Vega." A. Hovgaard, London.
1883. The Voyage of the "Jeannette." The Ship and Ice Journals of George W. DeLong, Lieutenant Commander, U. S. N., and Commander of the Polar Expedition of 1879-1881. Edited by his wife, Emma DeLong. Houghton, Mifflin & Co.
- " The Jeannette, and a Complete Encyclopædia of all Voyages and Expeditions to the North Pole. Captain R. Perry. Newman and Coburn Publishing Company, Chicago.
- " Narrative of the "Jeannette." Lieutenant Danenhower, U. S. N. J. R. Osgood & Co.
- " Proceedings of a Court of Inquiry, Convened at the Navy Department, Washington, D. C., October 5, to Investigate the Loss in the Arctic Seas of the Exploring Steamer "Jeannette."

1883. **Work of the Signal Service in the Arctic Regions.** Signal Service Notes No. V.
“ **Report on Lady Franklin Bay Expedition.** Signal Service Notes No. X.
“ **Meteorological and Physical Observations on the East Coast of British America,**
by Orray Taft Sherman. Professional Papers of the Signal Service, No. XI.
1884. **American Explorations in the Ice Zones, 1850-1882;** by Professor J. E. Nourse,
U. S. N. D. Lothrop & Co., Boston.

For the chief scientific reviews of the labors of Arctic explorers see journals, bulletins, and reports of the American and foreign Societies, especially those of the American Geographical Society, the Smithsonian Institution, the American Journal of Science, the Royal Geographical Society, the Société de Géographie of Paris, and the bulletins of the Imperial Geographical Societies of Russia, Sweden, and Holland. References to the volumes of these which contain Arctic material will be found generally in full in the “Die Literatur über die Polar Regionem der Erde,” von Drs. Josef Chavanne, A. Karpf and F. R. LeMonnier, Wien, 1874. For a synopsis of the work of each American explorer under commission by the United States Government, see Reports of the Secretary of the Navy, the Secretary of War, and the Secretary of the Treasury.

INDEX.

See additions to the Index on page 624.

- АСТКА, visited by the Fenimore Cooper in search of the Monongahela, 117.
- Advance, the, equipped by Grinnell, 49; sails from New York, 50; crosses Melville Bay, 54; reaches Beechey Island, 55; returns to New York, 59; loaned to Kane, 65; equipped, 68; in Rensselaer harbor, 71; abandoned, 88.
- Agloo, or Igloo seal, 195.
- Aglooka (Crozier), described to Hall, 248.
- Albatross of the North Pacific, 505; of the Antarctic, 506.
- Allen, William, letter to Thomas Penn, 27.
- Alliance, the cruise of, 485.
- Ambler, J. M., surgeon of the Jeannette, 382; describes Bennett Island, 401.
- American early voyages for Northwest Passage, 24.
- American explorations, table of, 527; beneficial results, 558.
- Amoukta Passage the, examined by Brooke, Fillebrown, and Knorr, 129.
- Andromeda Tetragona, 72.
- Angekos, and Ankooting, 196, 216, 245.
- Antarctic zone, compared with Arctic, 18, 491; discoveries in by Palmer, 494; by Wilkes, 508; by Ross, 513; by D'Urville, 514; ice within, 522, 524.
- Antisell, Dr., on the Kuro Siwo, 368.
- Arctic exploration, the field of, 17; original object, 20; beneficial results, 20, 525; DeHaven's, 41; Kane's, 65; Rodgers', 108; Hayes, 132; Hall's first, 161; second, 199; third, 269; Schwatka's, 345; DeLong's, 363; Hooper's, 428; Long's, 458; Raynor's, 463; Berry's, 473; Wadleigh's, 485; table of, 527.
- Arctic night, described by Hayes, 144; by DeLong, 393.
- Argo, the voyage of (1753), 25.
- Auroras seen by Hall, 239, 241; by Mauch, 306, 309; by Powell, 556.
- BABER, G. F., Midshipman, lost at sea, 112.
- Bache, A. D., Superintendent Coast Survey, aids the Grinnell expedition, 60, 65; endorses Arctic exploration, 526.
- Baker's death, 76.
- Barrow, Sir John, revives Arctic exploration, 30; sends out a tablet in memory of Bellot, 57; endorses Arctic exploration, 529.
- Barrow Point, meteorological station at, 553.
- Beechey Island, visited by DeHaven, 56; visit attempted by Kane, 78.
- Bennett, James G., purchases the Pandora, 364; interview with Dr. Petermann, 365; sends Jackson to search for DeLong, 407; Bennett Island discovered, 400.
- Bering Strait, voyage to by Cook, 23.
- Berry's, R. M., Lieutenant, search for DeLong, 473, 527.
- Bessels, E., sails with Hall, 270; pendulum observations, 307.

- Bliss, S. J., Acting Lieutenant, lost at sea, 112.
 Boats, the three, leave Bennett's Island, 402; Semenovski Island 403.
 Boggs, W. B., Purser on the Vincennes, 111.
 Bonsall, Amos, sledge party under Kane, 73.
 Braine, D. L., Captain, sails for relief of Hall, 325; returns to New York, 326.
 Bridge, W. K., Acting Lieutenant, lost at sea, 112.
 Brooke, John M., Lieutenant, U. S. N., on the Vincennes, 111; notes of the loss of the Porpoise, 113; survey on the Japanese coast, 114; deep sea sounding apparatus, 118; notes at Semiavine Straits, 123.
 Brooks, Henry, second officer of the Rescue, 47.
 Budington, S. O., sails with Hall, 270; commands the Polaris, 298; fails to get North, 312; rescued by the Ravenscraig, 329.
- CABOTS, the voyages of the, 21.
- Capes, Alexander, 84, 93; Athol, 137; Beechey, 57; Constitution, 96; East, 124; Farewell, 53; Independence, 96; Isabella, 78; Lieber, 148; Lisburne, 433; Riley, 57; Sabine, 542; Serdze Kamen, 377, 451; Spencer, 56; Union, 147; York, 136, 326.
- Carter, R. R., Passed Midshipman, U. S. N., on the Rescue, 47.
- Chandler, W. E., Secretary of the Navy, telegram to by Melville, 413; orders to Danenhower, 414; to Harber, 418; convenes Relief Board, 563.
- Chapell, R. H., assists Hall, 205.
- Chester, H. C., lands Hall, 209; sails on the Polaris, 279; boat journey, 310.
- Chipp, C. W., Lieutenant, U. S. N., Naval Record, 374; attempts landing on Herald Island, 380; aurora seen by, 394; on sick list, 397; commands second cutter, 402; searched for by Melville, 416; by Harber, 418.
- Clay, Henry, Hon., presents the Grinnell memorial, 46.
- Clayton, John, Secretary of State, letter to Lady Franklin, 42.
- Coast survey, United States, aids Kane's expedition, 65; aids Dr. Hayes' expedition, 133.
- Collins, Jerome, Jr., meteorologist of the Jeannette, 373.
- Conger Fort, 537.
- Congress, United States, resolution for DeHaven's expedition, 44; appropriations for relief of Kane, 86; for Ringgold's expedition, 108; for Hall's third expedition, 269.
- Cook, James, Captain, Arctic voyage, 23; Antarctic voyage, 492, 519.
- Cooper, J. Fenimore, the, 109.
- Corwin, revenue steamer, the, sails in search of the whalers and DeLong, 429; second search, 447; officers of, 448.
- Currents of the Arctic, local only, 368.
- DALL, W. H., coast survey on the Kuro Siwo, 367.
- Danenhower, J., Lieutenant, U. S. N., joins DeLong at Havre, 365; placed on sick list, 383; search for DeLong, 407; returns to United States, 408.
- Davenport, Captain, U. S. N., commands the Congress, 275.
- Davis, Jefferson, objects to Arctic appropriations, 47.
- Davis', John, voyages, 22.
- DeHaven, E. J., Lieutenant, commands first Grinnell expedition, 47; instructions of the department to, 48; drift in Wellington Channel, 59; final report to Navy Department, 55; commendation by Secretary of Navy, 61.
- DeKraft, J. C. P., Commodore's chart of Bering Sea and North Pacific, 115.
- DeLong, G. W., Lieutenant, U. S. N., naval record, 363; proposes an Arctic exploration, 364; chooses the Bering Strait route, 365; errs in this, 367; sails from San Francisco, 373; visits Cape Serdze Kamen for Nordenskiöld, 377; enters the pack, 378; abandons theory, 388; discovers Jeannette and Henrietta Island, 396; abandons the Jeannette,.

- 598; discovers Bennett Island, 400; lands on Semenovski Island, 403; on the Delta, 409; last journal notes, 411; buried by Melville, 414; his tomb visited by Harber, 420; brought to United States, 427.
- Diligence, voyage of the, 25.
- Disco, visited by DeHaven, 59; by Hartstene rescuing Kane, 91; by Braine, 325; by Greer, 326; by the Neptune, 546; by the Yantic and the Proteus, 548.
- Dobbin, Secretary, instructions to Hartstene, 91.
- Dogs, Eskimo, disease of, 253.
- EBIERBING (Joe), first met by Hall, 176; seal hunts, 230; history of, 340; accompanies Hall, second expedition, 206.
- Elder's, Dr., biography of Kane, 51.
- Eothen, the, sails from New York, 347.
- Erebus and Terror, visit to Tasmania, 31; sailing for Northwest Passage, 32.
- Eskimos or Innuits, first met by Hall, 176; Armon, Artooa, and Ouela, 210, 212; Armon's coast line, 243; feasts of, 215; games, 216; Eskimos of Etah, 82, 89; of the Northwest coast, 440.
- Expeditions, Arctic, Cabot's, 21; Davis', Hudson's, and Baffin's, 22; the Argo and Diligence, 25; the Trent, 31; Franklin's, 32; for relief of Franklin, tables of, 35, 37; DeHaven's, 41; Kane's, 65; Rodgers', 108; Hayes', 132; Hall's, 162, 199, 269; Schwatka's, 345; DeLong's, 363; Hooper's, 438; Long's, 460; Raynor's, 463; Berry's, 473; Wadleigh's, 485.
- FILLEBROWN, T. S., Lieutenant, on the Vincennes, and naval record, 111; observations, 122.
- Florence, the cruise of, 535.
- Folger, W. J., Secretary of Treasury, tribute to Rodgers, 115.
- Foulke Fort, Hayes' winter quarters, 137.
- Franklin, Benjamin, Dr., secures a voyage for Northwest Passage, 25.
- Franklin, Sir John, early life, 30; voyage on the Trent, 31; journeys to North coast of America, 31; last expedition, 32; relief expeditions for, 35; monument in Waterloo Place, 39; in Westminster Abbey, 40; discovers Northwest Passage, 39, 266.
- Franklin, Lady J., letters to President Taylor, 41; monument to Sir John at Beechey Island, 57; invites Kane to make explorations, 68.
- Franklin expedition, records found by Hobson, 162; relics of, 38.
- Frobisher's, Martin, shorter route to Cathay, 21; three voyages, 186; relics of brought home by Hall, 203; Admiral Collinson's voyages of, 203.
- Fyffe, J. P., Lieutenant, attached to the Relief, 91.
- GEOGRAPHICAL Society, American, receives Kane, 66; receives Hall, 165.
- Gilder, W. H., visits the Kinnepatoos, 349; sledge journey with Schwatka, 358; sums up the results of the expedition, 360.
- Glacier, Great, of Greenland, visited by Kane, 76, 102; system discussed by Hayes, 153.
- Glassenapp, observing party from the Vincennes located on, 121.
- Godhavn, visited by Kane, 89; by Hall, 71; by the Florence, 536; by the Proteus, 538.
- Graves, the three found on Beechey Island, 56.
- Greenland, Northern extension of, 67, 95, 97.
- Greer, J. A., Commander, sails for relief of Hall, 324; returns to New York, 327.
- Greely's, A. W., Lieutenant, expedition to Lady Franklin Bay, 537.
- Grier, Wm., Fleet Surgeon to exploring expedition, 111.
- Griffin, S. P., U. S. N., commands the Rescue, 47.

Grinnell Land, discovered by DeHaven, 60; East coast of Grinnell Land discovered by Kane, 96; traced by Hayes, 132.
 Grinnell, Henry, visit to by Lady Franklin, 44; memorial to Congress, 45; equips the *Advance* and the *Rescue*, 49; fits out the *Advance* for Kane, 65; presentation of vase to Kane, 104; aid to Hall's first expedition and second expedition, 205.

HABERSHAM, A. W., Lieutenant, on the loss of the *Porpoise*, 112.

Hall, C. F., early Arctic studies, 162; sails on his first expedition, 167; at Cyrus Field's Bay, 174; discovers Frobisher's relics, 182; returns to United States, 198; sails on second expedition, 206; at Marble Island, 209; captures a whale, 233; at Fort Hope, 235; first journey to King William Land, 244; to Igloolik, 250; to Cape Weynton, 252; to Fury and Hecla Strait, 256; reaches King William Land, 261; sails in the *Polaris*, 270; last sledge journey, 293; despatch to Secretary of Navy, 295; death, 297; character, 331; medal from Geographical Society of Paris, 333; tablet erected by Nares, 338.

Hancock, the steamer, 109.

Harber, G. B., Lieutenant, U. S. N., sent out for the bodies of DeLong and his comrades, 407; report to Secretary Chandler, 423; return to the United States, 427.

Hartstene, H. J., commands the relief ship for Dr. Kane, 87; naval record, 91; brings Kane to New York, 91.

Hayes, Isaac I., Dr., surgeon of the *Advance*, 68; explorations with Kane, 77; commands the expedition of 1860, 132; crosses Melville Bay, 136; winters at Port Foulke, 137; reaches Cape Lieber, 147; discussion on "the open Polar Sea," 149; on the Glaciers, 153; returns to the United States, 156; receives medals, 158.

Hazen, W. B., General, U. S. A., co-operates with International Polar Commission, 534; instructions to Greely, 538; to Ray, 552.

Hendrick, Hans, joins Kane, 69; journey with Hayes, 72; account of Sonntag's death, 140; joins the *Polaris*, 275; his own narrative, 141.

Henrietta and Jeannette Islands discovered by DeLong, 395.

Henry, Joseph, Professor, aids the second Grinnell expedition, 65; endorses Arctic explorations, 526, 528, 534.

Herald Island visited by Kellett, 453; by Rodgers, 125; by DeLong, 379; by Hooper, 453; by Berry, 477.

Holsteinborg visited by DeHaven, 59; by Hall, 168; by McClintock, 169.

Hooper, C. L., Captain, Revenue Marine Steam Cutter, first cruise, 429.

Hudson, W. L., Lieutenant, commands the *Peacock*, 500; land seen by, 509.

Hunt, W., Secretary of Navy, convenes Relief Board for DeLong, 474; telegram to Melville, 413; to Harber, 408.

Hydrographic Office, United States, charts of the Arctic sea, 115.

ICE of the Arctic described by Hooper, 439; by Powell, 555.

Ice of the Antarctic described by Wilkes, 522.

Icebergs met by Kane, 62, 70; by Hayes, 134; by Hall, 172.

Irving, Lieutenant, R. N., grave discovered by Schwatka, 353.

JEANNETTE, the, purchased by Mr. Bennett, 364; brought round the Horn, 365; equipped at San Francisco, 372; officers' roll, 373; reaches Cape Serdze Kamen, 377; in the pack, 378; zigzag course northwest, 388; crushed, 398.

Juniata, the, sails for relief of Hall, 324.

KANE, E. K., Dr., surgeon of the first Grinnell expedition, 47; naval record, 48; surgeon to United States Embassy, China, 51; in Mexico, 52; joins DeHaven, 47; notes of

- geographical discovery, 60; commands second Grinnell expedition, 68; in Rensselaer Harbor, 73; explores the Great Glacier, 76, 95; fails to reach Beechey Island, 81; rescued by Hartstene, 89; report to Secretary of Navy, 95; graphic sketches, 62, 100, 102; receives medals from Royal Geographical Society and Paris Geographical Society, 105; death, 105.
- Kane, John P., Dr., describes the navigation of Melville Bay, 92.
- Kennedy Channel, Kane's exploration, 87.
- Kennedy, J. P., Secretary of the Navy, aids Kane, 67.
- Kern, E. W., artist, 110.
- Key-low-tik and Ken-toon performers, 217.
- Kislingbury, F. F., Lieutenant, of Franklin Bay Expedition, 537, 541.
- Knorr, E. R., assistant draughtsman on the Vincennes, 122; observations on the cruise, 129.
- Kümlien, Mr., naturalist of the Florence, 536.
- Kuro Siwo, the waning influence of, 367.
- LADY FRANKLIN BAY**, station at, 537.
- Lesseps, M. Ferd., de, President Société de Géographie, address on presenting the medal to Schwatka, 361.
- Littleton Island, visited by Kane, 70; by Hartstene, 94; by the Proteus, 541.
- Lockwood, James B., Lieutenant of Franklin Bay expedition, 537, 541, 544.
- Long, Thomas, first visits Wrangell Land, 460.
- Lovell, W. J., Midshipman, U. S. N., attached to first Grinnell expedition, 47; to the relief ship Rescue, 91.
- MAURY, M. F.**, assists first Grinnell expedition, 44; the second expedition, 65; endorses the object of Arctic expeditions, 525, 561,
- McClintock, Sir Leopold, R. N., crossing the North water, 54.
- Medals awarded to Kane, 105; to Hayes, 158; to Hall, 333; to Schwatka, 362.
- Melville, G. W., Chief Engineer, naval record, 379; letter from St. Lawrence Bay, 376; boat journey to Herald Island, 380; to Henrietta Island, 396; rigs a windmill pump, 387; commands the whaleboat, 406; searches for DeLong, 413; for Lieutenant Chipp, 416; returns to United States, 418; receives a letter from General Tcherniaieff, 427.
- Melville Bay, crossing of, by DeHaven, 54; by Kane, 70; by Hayes, 136; by McClintock, 136.
- Meteorological Stations, under the International Commission, 531-535.
- Miller, Senator, advocates first Grinnell expedition, 46.
- Morton, William, reports an open Polar sea, 77.
- Mount Wollaston and the Vigilant, search for, by Hooper, 432.
- Muir, John, Professor, exploration of Herald Island, 454, 456.
- Murdaugh, W., passed Midshipman on the Advance, 48.
- Museum, National, the, collections received by, 517, 527.
- Musk ox, capture of, 264.
- NARES**, Captain George, R. N., commends Hans, 69.
- Naval Officers' Record of first Grinnell expedition of relief ships for Kane, 91; of the Vincennes, 111; of DeLong's expedition, 476; of Wilkes', 496.
- Neptune, cruise of the, 545.
- Nichol, W. L., Assistant Surgeon Vincennes, 111.
- Nindemann and Noros sent forward by DeLong, 412.
- North Water, the crossing of, 54, 136.
- Northwest Passage, origin of the problem of, 21; attempts for by Cabot, Verrazani, Cartier, Davis, Hudson, and Baffin, 22; by Cook, 23; by the Argo and the Diligence, 25, 26; by Franklin, 33; by the relief ships, 35.

- OBSERVATORY, Astronomical, Kane's, 73.
 Osborn, Admiral, R. N., commends DeHaven, 50; endorses Arctic exploration, 409.
- PALMER'S LAND, 494.
 Pavy, O., Dr., Assistant Surgeon of Station Lady Franklin Bay, 537, 541, 543.
 Peabody, Mr., of London, contributes to second Grinnell expedition, 65.
 Pendulum, Dr. E. Bessels', 306.
 Penguins, 505.
 Pennsylvania Historical Society, the Penn papers, 27.
 Petroplovski visited by the Vincennes, 116.
 Phipps, Captain, voyage, 23.
 Polaris, the, sails from New London, 270; reaches $82^{\circ} 16'$, 280; drift of, 284; anchored, 286; attempts to go north, 312; carried from the floe, 316; abandoned, 327; sunken, 226.
 Polar, open sea, the, advocated by Maury, 49; reported seen by Morton, 79; Kane's judgment of it, 98; Hayes' discussion, 149; Nares', 151.
 Pole, the North, voyages for, 21, 22, 23, 24, 25, 26, 27, 34.
 Porpoise, the brig, loss of, 112.
 Potts, S. J., Jr., lost at sea, 112.
 Preston, Secretary of Navy, instructions to DeHaven, 48.
 Proteus, the voyage of, 1881, 538; of 1883, 548; crushed, 549.
 Pröven visited by DeHaven, 59.
 Putnam, C. F., U. S. N., 476, 483.
- RAVENS CRAIG, the, rescues the Polaris party, 327.
 Ray, P. H., Lieutenant, U. S. A., station at Point Barrow, 547, 552.
 Raynor, G. W., visits Wrangell Land, 464.
 Reily, W., Acting Lieutenant, lost at sea, 112.
 Reindeer seen by Schwatka, 356.
 Relief ship for Kane, the Release and the Arctic under Hartstene and Simms, 86, 88, 91.
 Rensselaer Harbor, the Advance moored in, 71; visited by Hayes, 72.
 Rescue, the, loaned by Grinnell to DeHaven, 47; wrecked, 174.
 Resolutions by United States Congress for DeHaven's expedition, 44; for relief of Dr. Kane, 86.
 Rewards by United States to natives at St. Lawrence Bay, 484; by the Czar to the Ispravniks and natives who assisted Melville, 427.
 Ringgold, Cadwalader, commands the exploring expedition of 1853, 108; returns to United States on sick leave, 111.
 Robeson, Geo., instructions to Hall, 271; Robeson Channel named by Hall, 280; examined, 288.
 Rodgers, John, Lieutenant, exploration in the Arctic Seas, 108, 131; sails in the Hancock, 109; succeeds to the command of exploring expedition, 111; surveys North Pacific, 114; Northern cruise, 116; sails over the reported position of Plover Island, 125; approaches Wrangell Land, 128; returns to San Francisco, 129; report not published, 114, 131.
 Rodgers, the cruise of, 473; burned, 482.
 Roe, F. A., Commodore, Lieutenant on the Vincennes, and naval record, 111.
 Ross, James, Captain, receives Wilkes' chart, 513; commendation of Wilkes, 516.
 Rosse, Dr., surgeon of the Corwin, notes of optical illusions, 438.
 Russell, J. H., Captain, Lieutenant on the Vincennes, and naval record, 111; boat landing at Glassenapp, 119; astronomical observations, 121.
- ST. JOHNS, Newfoundland, visited by DeHaven and Kane, 68.

- St. Lawrence Island, visited by Rodgers, 119; by Hooper, 430; and by DeLong, 376.
- Schoonmaker, C. M., Commander, brings the floe party to Washington, 323.
- Schott, C. A., discusses Kane's observations, 74; Hayes', 137.
- Schubert's death, 76.
- Schuetze, Master, sent out for the bodies of DeLong and officers, 407.
- Schwatka, F., Lieutenant, sails from New York, 347; crosses the Wager and Back river, 351; finds Hall's cairn, 352; finds Lieutenant Irving's remains, 353; explores King William Land, 354; sledge journey of, 356; return to United States, 360; receives the Roquette medal, 362.
- Scientific corps of the North Polar expedition of 1871, of Wilkes' expedition, 498.
- Scoresby, Captain, reports of open water in the Arctic, 30.
- Sea, an open Polar, advocated by Maury, 49; by Kane, 68, 97; by Hayes, 149; denied by Richards, 151; by Nares, 152.
- Seals, mode of capturing described by Hall, 194; United States revenue from Alaska, 560.
- Secretary of the Navy Preston's instructions to DeHaven, 48.
- “ “ “ Kennedy's instructions to Kane, 68.
- “ “ “ Dobbin's instructions to Hartstene, 91.
- “ “ “ Toucey's report on the cruise of the Vincennes, 114.
- “ “ “ Thompson's instructions to DeLong, 369.
- “ “ “ Chandler convenes Relief Board, 563.
- Semiavine Strait, 128.
- Seward, Senator, advocates Grinnell expedition, 46.
- Sherman, O. T., meteorologist of the Florence, 636.
- Sherman, Secretary, instructions to Hooper, 429.
- Shock's, Commodore, truss, 382.
- Simms, C. C., Lieutenant, commands the Arctic; naval record, 91; visits Cape Alexander, 93.
- Skin scraping by Sek-Koons, 220.
- Smithsonian Institution, aid to Kane's expedition, 67; publication of Kane's results, 74; aid to Hayes' expedition, 133; publication of Dr. Hayes' results, 160.
- Smith, Watson, Acting Master of the Advance, 91.
- Société de Géographie awards medal to Kane, 105; to Hayes, 158; to Hall, 333; to Schwatka, 362; notes on meteorological stations, 532.
- Sonntag, August, astronomer of Kane's expedition, 68; his observatory, 75; astronomer to Hayes' expedition, 133; death, 138; Hans' account of it, 140; his grave visited by Bessels and Bryan, 142.
- Spoon, Franklin's, sent to Miss Cracroft, 349.
- Stevens, H. K., Lieutenant, commands the Hancock, 111; recommends further surveys, 130.
- Stimpson, Wm., naturalist, 110.
- Stoney, Lieutenant, U. S. N., distributes rewards to the Tchuktchis, 484.
- Stuart, J. H., Assistant Surgeon, lost at sea, 112.
- Stuart, W. D., draughtsman, 110.
- TAGLIABUE, N. Y., contributes instruments to Hayes' expedition, 133.
- Taylor, Z., President, message to Congress, 43.
- Tchuktchis described by officers of the Vincennes, 120; by Hovgaard, 120.
- Tessiussak (or Tessuissak) visited by Hayes, 136.
- Thompson, R. W., Secretary Navy, instructions to DeLong, 369.
- Tigress, the cruise of, 325.
- Too-koo-litoo joins Hall. 176; accompanies second expedition, 206; loses her babe, 246; sails on the Polaris, 270; notice of, 340.

Tyson, Geo. E., sails with Hall, 270; rescued by the *Tigress*, 323; commands the *Florence*, 535.

UNITED STATES Centennial Arctic exhibit, 104.

Upervanik visited by DeHaven, 59; by Kane, 89; by Hayes, 135.

VAN WYCK, W. W., lost at sea, 112.

Vincennes, the flag-ship of Commodore Ringgold, 108; Arctic cruise under Rodgers, 114; extracts from log book, 126.

Vreeland, B., Surgeon of the *Rescue*, 47.

WHALEERS, the pioneers of discovery, 494.

Wildes, Commander, U. S. N., of the *Yantic*, 548, 551.

Wilkes, C. F., Lieutenant, commands Antarctic expedition, 495; officers' record, 496; sails from Sydney, 501; discovers land, 508; receives medal from Royal Geographical Society, London, 514; his summary of the cruise, 519; volumes published by Congress, 521; notes on the ice, 522.

Williams and Haven aid Hall, 166.

Willis, Hon. B. A., letter from Professor Henry, 534.

Wrangell Land, seen by Wrangell, 120, 124; by Rodgers, 128; by Hooper, 436; drifted past by DeLong, 467; visited by Berry, 478.

Wright, C., botanist of the Antarctic expedition, 110.

ZANE, A. V., Passed Assistant Engineer on the *Rodgers*, 477; accompanies Putnam, with Hunt and Castillo, 483.

ADDITIONS TO INDEX.

Alaskan explorations under W. U. Telegraph Company, 596; under U. S. Coast Survey, 599; by Lieutenant Ray, U. S. A., 604; by Lieutenant Nichols, U. S. N., 604; by Lieutenant Stoney, U. S. N., 608.

Alert, the, presented to the United States by England, 570; sails from New York, 572; returns from the Arctic, 591.

Bear, the, purchased by Secretary Chandler, 569; sails from New York, 572; reaches Payer Harbor, 584; returns to the United States, 591.

Chandler, W. E., Secretary Navy, purchases the *Bear*, 569; orders for the despatch of the relief ships, 570; instructions to Schley, 572.

Coffin, Lieut.-Commander, U. S. N., sails in the *Alert*, 572; returns from the Arctic, 591.

Colwell, Lieutenant, U. S. N., finds Greely, 585.

Dall, W. H., U. S. Coast Survey, explorations of Alaska, 598, 603.

Emory, W. H., Lieutenant, U. S. N., sails in the *Bear*, 572; reaches Upervanik, 582; Payer Harbor, 584; returns to the United States, 591.

Greely, A. W., sustains his party at Fort Conger, 567; begins his return, 568; relief provided for, 569; telegrams of his rescue, 574; condition when found, 577, 585; results of observations, 578, 580; records found, 586.

Kennicott, Robert, explorations in Alaska, 599.

Lockwood, J. B., U. S. A., explorations, 578, 587; buried at Annapolis cemetery, 580.

Relief ships, cruises of, 581; outlay for, 592.

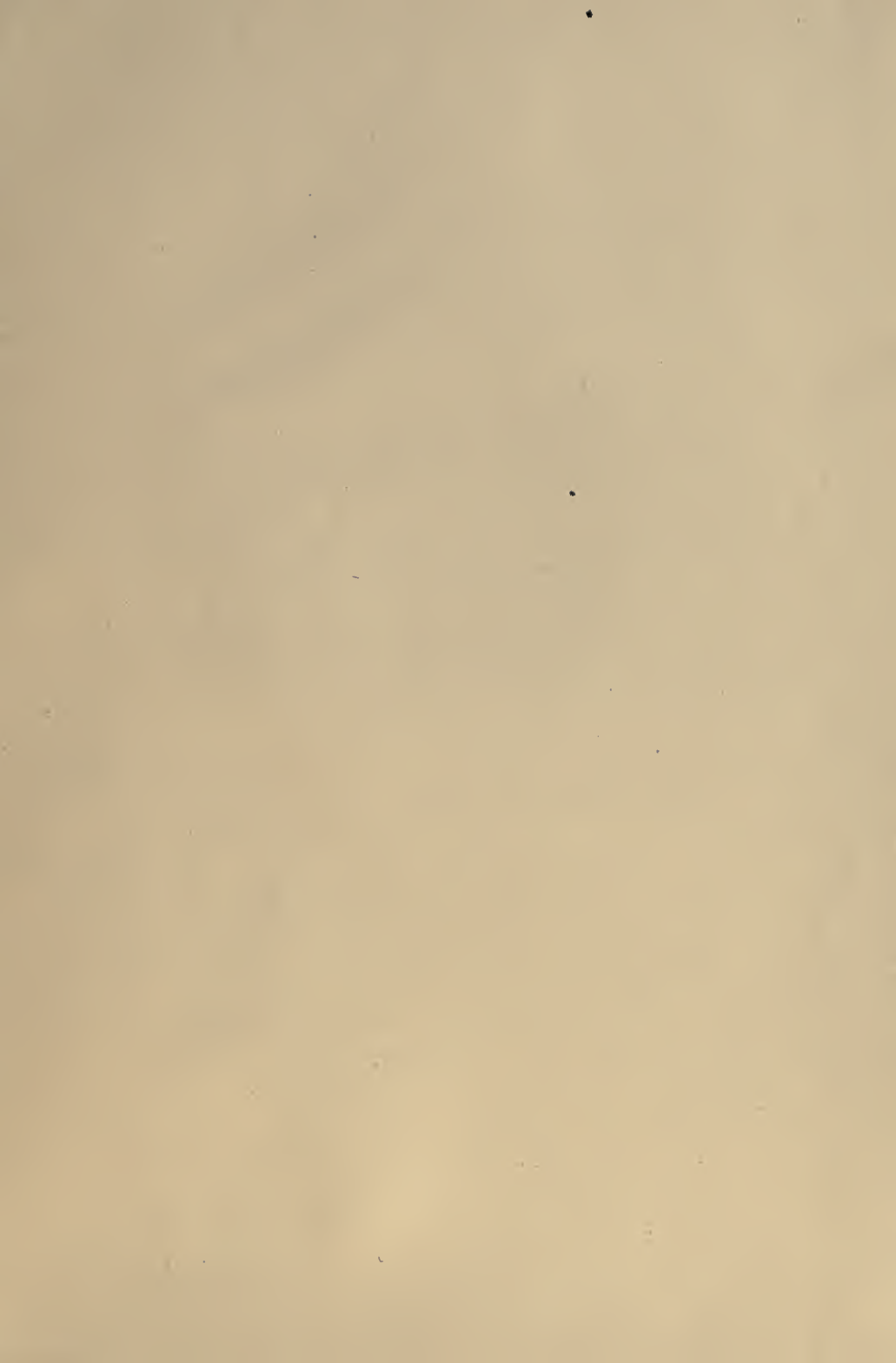
Rice, Sergeant, U. S. A., record by, found, 590.

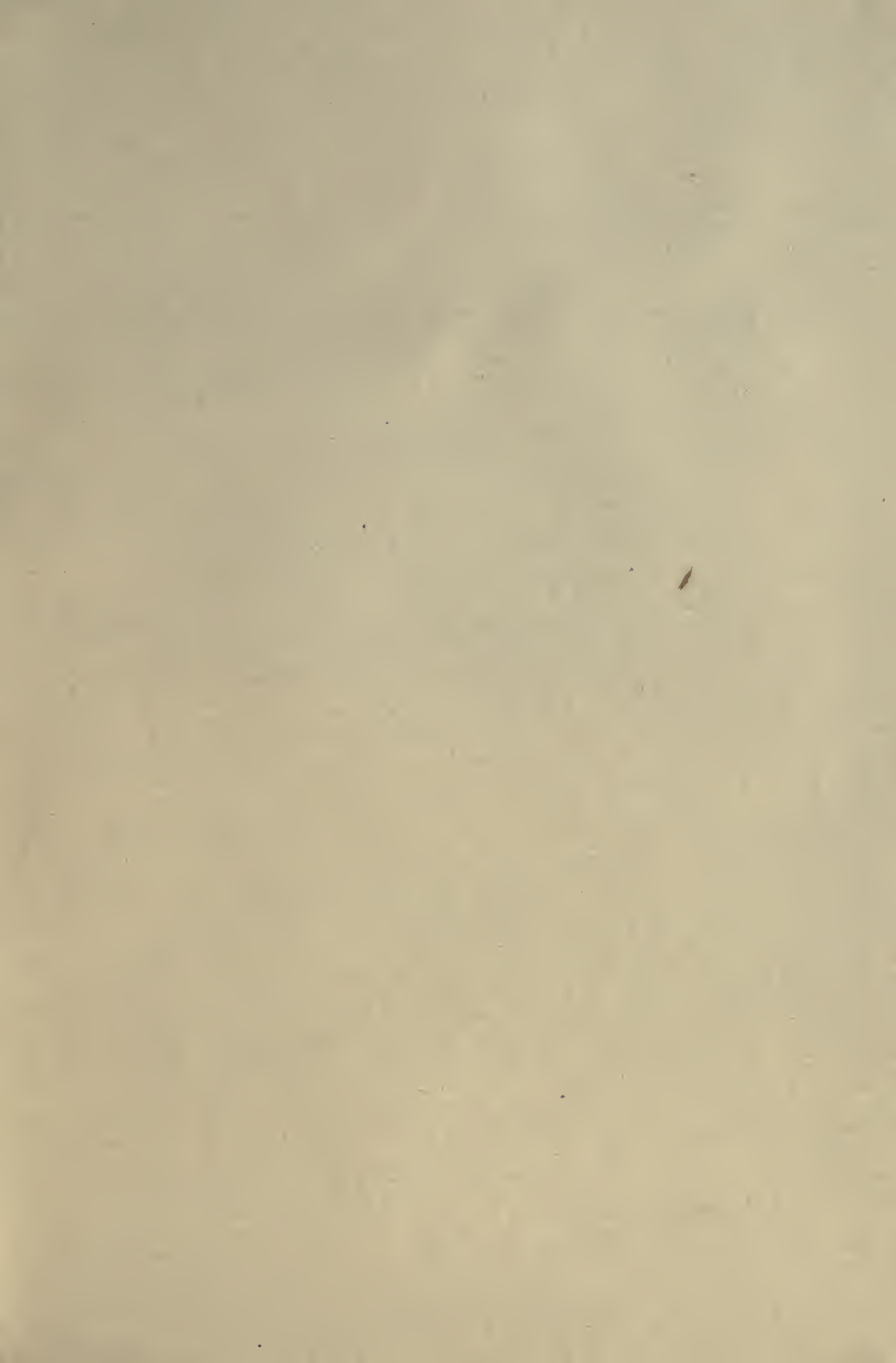
Schley, Commodore, U. S. N., commands the Relief Expedition, 581; finds the whalers at Upervanik, 584; finds Greely at Cape Sabine, 585; returns to the United States, 591.

Telegrams of the rescue of Lieutenant Greely, 574.

Thetis, the, purchased, 569; sails from New York, 572; reaches Cape Sabine, 584.

Yukon, the, visited by Kennicott, 598; by Stoney, 610.





14 DAY USE
RETURN TO DESK FROM WHICH BORROWED
LOAN DEPT.

This book is due on the last date stamped below, or
on the date to which renewed.
Renewed books are subject to immediate recall.

21 Jul '65

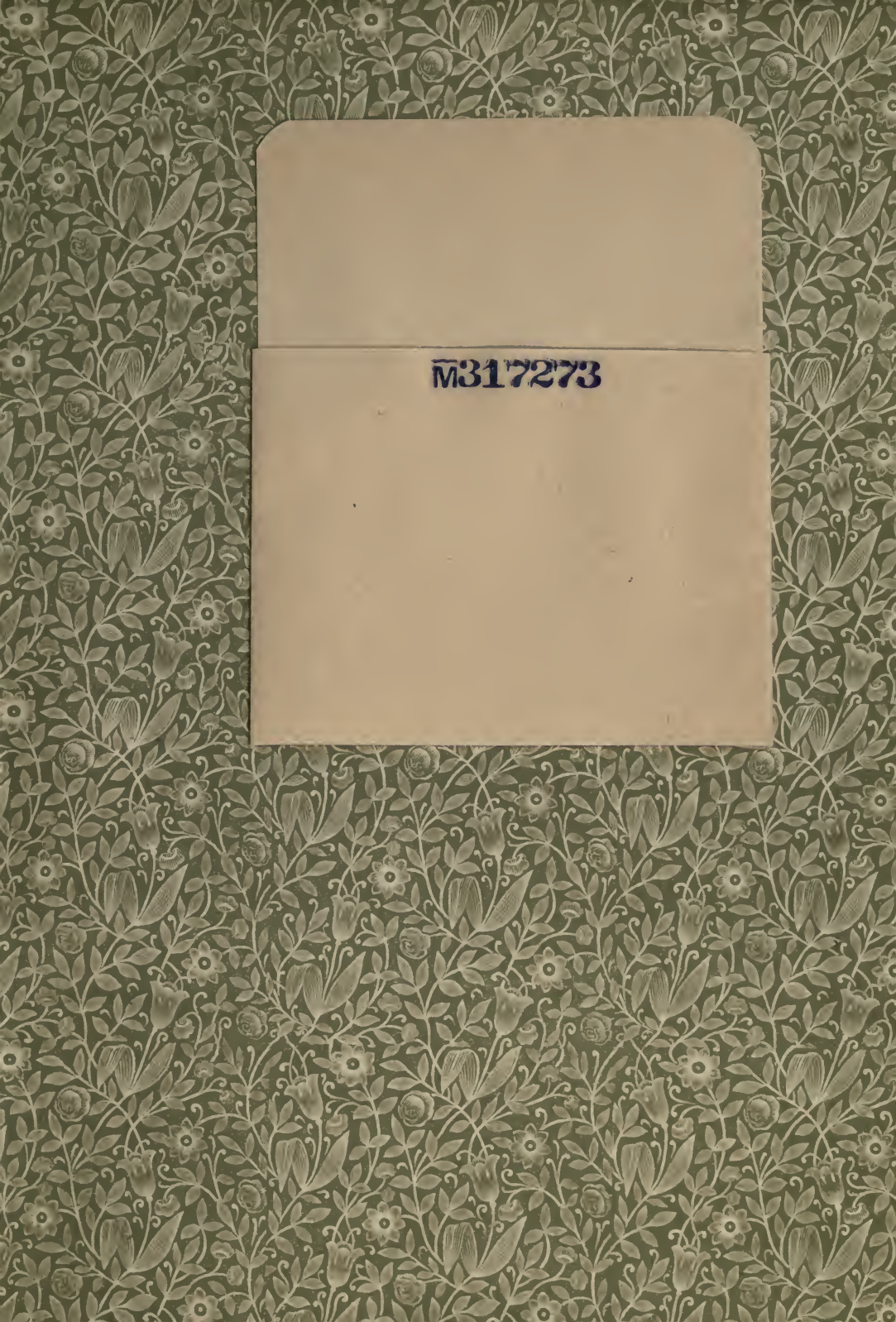
4

REC'D LD

AUG 11 '65-8 AM

LD 21A-60m-3,'65
(F2336s10)476B

General Library
University of California
Berkeley



M317273

